D AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

INDO-PACIFIC FISHERIES COUNCIL

PROCEEDINGS

8th SESSION

COLOMBO

CEYLON

6—22 December 1958

SECTION I

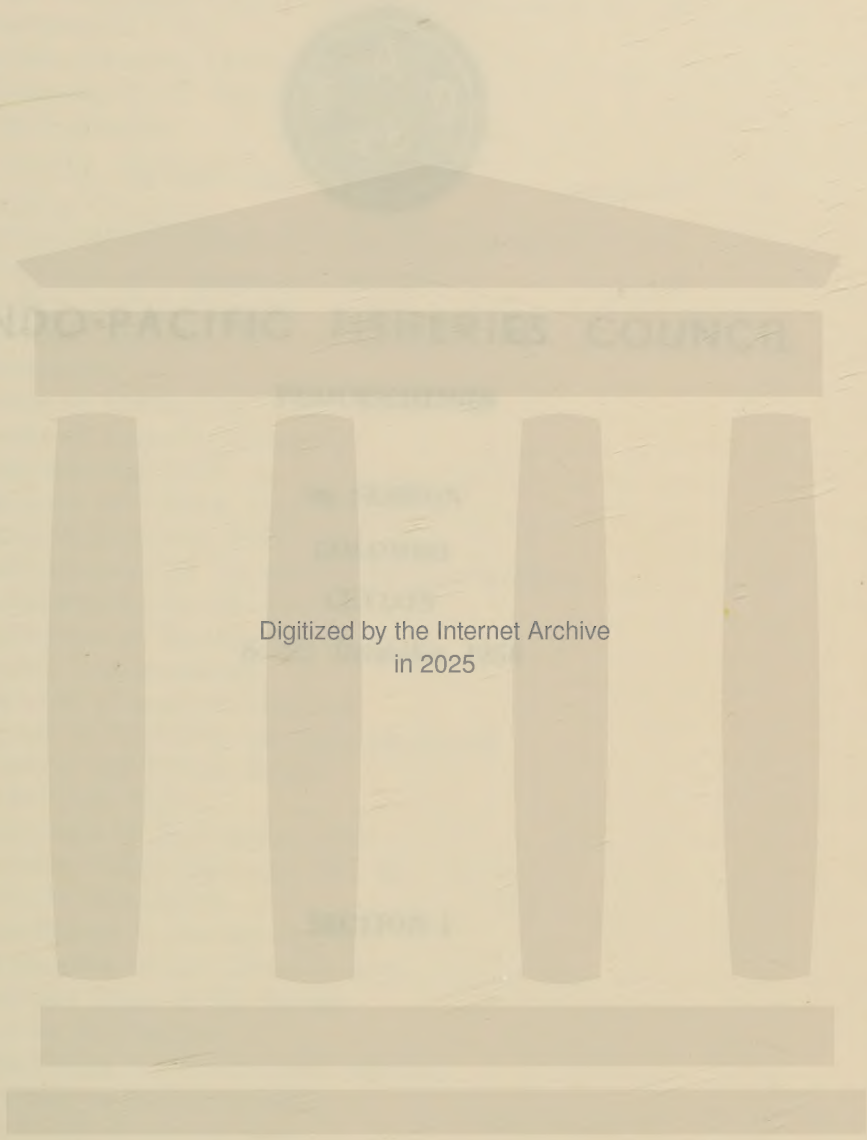
IPFC Secretariat, FAO Regional Office
for Asia and the Far East
Bangkok
1958

OFFICE BEARERS OF THE INDO-PACIFIC FISHERIES COUNCIL

for the period 1958 till 9th Council Session

Chairman:	*Monsieur Tran Van Tri*
Vice-Chairman:	*Mr. D.T.E.A. de Fonseka*
Member:	*Dr. K. Kuronuma*
*Secretary:	*Mr. J.A. Tubb*

*** The office of the Secretary of the Council is currently discharged by the FAO Regional Fisheries Officer for Asia and the Far East.**



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CONTENTS

		Page
g	Address by the Minister of Industries sheries, Government of Ceylon	1
ge	of Welcome from Prime Minister of Ceylon	2
s	by Director-General, FAO	3
ge	from Director, Fisheries Division, FAO	3
s	by the Chairman, Dr. K. Kuronuma	4
a	for the Eighth Session	5
TER 1.	COUNCIL PROCEDURE	5
	Opening Ceremony	5
	Statements from Member Governments	6
	Statements from Observer Organizations	9
	Election of Vice-Chairman	10
	Steering Committee	10
	Membership	10
	Report on Credentials	10
	Report of Executive Committee	10
	Relations with FAO	10
	Relations with Other Organizations	11
	Council's Report to FAO	11
	Implementation of 7th Session Recommendations	11
	Documentation for 8th Session	11
	Nomination of Technical Committees	11
	Council Correspondents	11
	Technical Committee Meetings	12
	Reports of Technical and Sub-Committees	12
	Financial and Budget Report	12
	Expenditure 1958	13
	Programme of Expenditure 1959	14
	Proposed Budget Estimate 1960—61	14
	Council's Symposium	14
	Amendments to the Agreement	15
	Organization of the Council's work	15
	Time and Place of 9th Session	16
	Election of Chairman	16
	Participation in International Meetings	16
	Principals of Fisheries Policy	17
	Indo-Pacific Fisheries Year	17
	Formal Resolution of Thanks	17
TER 2.	RESOURCES	18
	Reference Books	18
	Age determination of fish	19
	Standardization of Plankton Nets	19
	Identification of fish and plankton	20
	Population dynamics	20
	Fish culture in general	21
	Diurnal feeding rhythms	21

Soil compostion in fish ponds ... ...
Problems arising from the introduction of non-Indigenous Fishes ... ...
Weed Control ... ...
Stocking of natural swamps and other economically unproductive waters
Fish Culture in Rice Fields ... ...
Nutrition of fish under cultivation ... ...
Chanos ... ...
River Basin Development ... ...
Water Pollution ... ...
Hilsa ... ...
Rastrelliger ... ...
Mugil ... ...
National resources for the study of basic productivity of the sea ... ...
Faunal Changes ... ...
Trawling ... ...
Oceanography ... ...
Tuna ... ...
Sardines ... ...
UNESCO ... ...
Appendix: Report of Technical Committee I ... ...

CHAPTER 3. TECHNOLOGY AND ECONOMICS ... ...
General ... ...
Craft and Gear ... ...
Food Technology ... ...
Statistics ... ...
Socio-Economics ... ...
Fish Marketing ... ...
Appendix: Report of Technical Committee II ... ...

CHAPTER 4. PUBLICATIONS ... ...
Council Proceedings ... ...
Eighth Session Symposium ... ...
Current Affairs Bulletin ... ...
Reference Books ... ...

CHAPTER 5. TECHNICAL ASSISTANCE ... ...
Training Centers ... ...
Aid-Giving Agencies ... ...
Expert Assistance ... ...

CHAPTER 6. RECOMMENDATIONS ... ...
A. to Member Governments ... ...
B. to F.A.O. ... ...
C. Executive Committee & Secretariat ... ...
D. Technical Committee etc. ... ...
E. Technical Assistance ... ...

CHAPTER 7. REPORT ON THE STATUS OF THE INDUSTRY ... ...

Appendices
I. List of Delegates and Observers ... ...
II. IPFC Nominations for the period between 8th and 9th Sessions ...
III. List of Documents ... ...

OPENING ADDRESS BY THE HON. MR. P.H. WILLIAM DE SILVA, MINISTER OF INDUSTRIES AND FISHERIES, CEYLON, AT THE EIGHTH SESSION OF THE INDO-PACIFIC FISHERIES COUNCIL

Chairman, Delegates, Ladies and Gentlemen,

: gives me great pleasure to be here today the eighth session of the Indo-Pacific s Council.

)n behalf of the Government of Ceylon I a warm welcome to delegates, officials tors from other countries who have come this conference. I trust that all of you oy your stay in Colombo and hope that l have time to see something of the rest Island before you leave.

Looking round at my distinguished e here today, I have not the slightest hat this conference is going to be a very le one to all concerned. Discussions and tions among fishery workers in a group this cannot fail to be both rewarding nulating, thus generating the enthusiasm essary for attacking the many difficult ns before us.

The fishing industry in Ceylon is just ng from a state of arrested development. ques and methods of a hundred years ago d more or less unchanged today. There le gap between what our people do now possibilities offered by modern science. ly by the application of modern scientific ues that we can develop and utilize to l our national resources, and raise the d of living of our people. A well-ed fishing industry will provide avenues loyment as well as food, both of which l problems to our rapidly growing popula-Fish is particularly important to us as a of food as it supplies in a form accepta-our people the much needed protein is known to be lacking in our diet. We rward, with the help of this Council, to good the arrested development in the

Ceylon has a coastline of over 1,000 miles placed advantageously overlooking a vast which stretches unbroken down to the tic across the entire southern hemi-Yet our fishing industry produces only half this Island's requirements of fish. Contributing factors towards this sad state of affairs are ignorance of the seas beyond a few miles from the coast, small scale fishing operations by individuals without sufficient capital and the use of primitive craft and gear.

We cannot afford to maintain for long our obsolete fishing craft and gear but it is extremely difficult to effect changes in the traditional methods adopted by our fishing population. In this difficult but essential task it is heartening to receive the advice and assistance of those who have successfully coped with similar problems in other countries.

In recent years our country has received considerable assistance from the parent body of this Council, namely the Food and Agricultural Organization of the United Nations. Through this agency, services of skilled technical personnel have been made freely available to us. In addition, generous gifts of nets, motors and boats have enabled us to make some progress towards modernizing our fishing industry.

I note with pleasure the intensely practical approach of this Council towards the fisheries problems of the Indo-Pacific Region, and the bold step of organizing panels and committees to guide an international group of scientific workers along a common path. This is a very practical application of the fact that the fisheries of all Indo-Pacific countries are closely linked. A scientist from Ceylon has participated in a recent seminar in Bangkok which sought to correlate studies of a particular fish, the mackerel, by workers in different countries. This session has scheduled a symposium on fish behavior which cannot be studied effectively by workers in one country alone. Through these and other projects this Council is performing the useful and essential function of coordinating research on an international scale to the undoubted benefit of each member country, I therefore hope that every encouragement will be given the Council to expand its activities.

I wish the Council all success in its deliberations and I have great pleasure in declaring open the 8th Session of the Indo-Pacific Fisheries Council.

MESSAGE OF WELCOME BY THE HON. PRIME MINISTER OF CEYLON, MR. S.W.R.D. BANDARANAIKE, TO THE EIGHTH SESSION OF THE INDO-PACIFIC FISHERIES COUNCIL

Mr. Chairman, Honorable Delegates, Ladies and Gentlemen,

I have great pleasure in welcoming you on behalf of the government and people of Ceylon, on the occasion of your participation in the Eighth Session of the Indo-Pacific Fisheries Council.

For the second time this year the Food and Agriculture Organization has seen fit to choose Ceylon as host country for an international conference, the first being the FAO Seminar on Land Settlement that has only just concluded its Sessions at Gal Oya. We appreciate this honour and shall strive to provide whatever facilities we have at our disposal for use by the agencies of the United Nations.

We have in our midst, today, tinguished gathering of Fisheries Admi tors and Experts from several countries. contribution at this Forum will be awaited, and I am certain that the delibe of this Session will prove of great val only to Ceylon but also to all other in achieving the final objective of e exploitation linked with the conservat marine resources.

I wish the deliberations of the Session all success and sincerely hope t participants will find their stay in Ceylo profitable and pleasant.

ADDRESS BY DR. B.R. SEN, DIRECTOR-GENERAL OF THE FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

. Chairman, Ladies and Gentlemen,

Once again, the need to be at the other end world prevents me from being with you. lding of the FAO Regional Conference for America has taken me to Santiago. At ne time, however, my belief that I should ally attend these highly important Re- Conferences has given me some know- of the problems that you will be tackling meeting. For at the recently conducted meeting, considerable attention was paid fisheries problems of the Region, and I hat a great deal of work was passed on ir attention.

A particular point was made of the neces- planning fisheries expansion in careful n to expansion in other sectors of the ny, and I know that you are charged with ng your governments on how this should e. The conference resolved that a prim- jective was the speedy increase of fish es for domestic markets, and set out three ines along which it believed this could be You are here today to decide just how to implement this decision. Finally, the conference pointed out the desirability of joint examination of problems in order to give guidance to fisheries departments. You are taking part in just such a joint examination.

At the opening of last year's conference in Bandung, I was able to tell you of an increase in FAO's help in the provision of fisheries technicians in the region. I am delighted to be able to tell you that this help has been still further increased, and if plans for next year are carried out, will be increased even more.

Finally, I must express FAO's gratitude to the Government of Ceylon for its generous offer to be host to this meeting. My fisheries advisers tell me that particular attention is to be paid this year to the mechanization of fishing, and I cannot help feeling that it is appropriate that this subject should be discussed in Ceylon; the country in which much of FAO's pioneer work in this field was carried out.

I wish you a happy and successful conference.

CABLE MESSAGE FROM DR. D.B. FINN, DIRECTOR OF THE FAO FISHERIES DIVISTON, ROME

CHAIRMAN, INPAFICO, COLOMBO

PLEASE CONVEY GREETINGS AND BEST WISHES DELEGATES 8TH SESSION STOP ESPECIALLY HOPEFUL OUTCOME YOUR INTENSIVE STUDIES OF RESOURCE APPRAISALS ESPECIALLY MACKEREL COMMA PRODUCTION PROBLEMS AND GEAR COMMA AND FISH MARKETING - FINN -

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ADDRESS BY THE CHAIRMAN OF THE INDO-PACIFIC FISHERIES COUNCIL—DR. KATSUZO KURONUMA, CHIEF, FRESHWATER FISHERIES, RESEARCH LABORATORY, FISHERIES AGENCY, TOKYO

It is my happiest duty first of all to express sincere thanks to the government of Ceylon for their hospitality and for the excellent facilities provided for us to hold the Eighth session of the Indo-Pacific Fisheries Council in this beautiful City of Colombo. To the Council I would offer my heartfelt thanks for having afforded me the honor of acting as your Chairman during the period 1957-1958.

The Indo-Pacific Fisheries Council having a deep interest in the development and proper utilization of the living aquatic resources of the Indo-Pacific area and desiring to further the attainment of these ends through international cooperation was established in 1949 based on the Agreement drafted in Baguio in the Philippines in February, 1948. Holding now the Eighth Session of the Council in this year of 1958, we may say that the Council has written 10 years of history. According to one of our old sayings in Japan, the passing of a ten-year period must have achieved one cycle of work. In this sense I am very sure that our Indo-Pacific Fisheries Council has accomplished an impressive amount of work along the line of the Baguio Agreement during the past 10 years and I find it difficult to catalogue even a minor portion of these accomplishments.

Today, we have come together here in this auditorium of the Royal College to discuss many subjects in accordance with the directives which were given at the Council's Seventh Session at Bandung and all the problems we are to deal with are placed before you in a number of documents prepared by the Secretariat. I would, however, like to mention a few points pertaining to the Council's work which should receive some consideration.

I do not need to say that fisheries f complex subject and may be conveniently d into three headings: research, administ and operations. I would like to make a s plea particularly for research work in fis The word research sounds very fine and attr to the researchers but that is not enough. research work should be interesting researcher personally but that again is not e What I want to emphasize is that re should be able to produce results that usable by the industries or by the admi tion.

It is very important to ensure th research subjects are clearly identified a problems evaluated in relation to the ind before the research program is implement

The second point I wish to ment this occasion is a need to investigate h can apply research results in practice. T exchange of ideas and knowledge is of very important in striving to achieve th goal of the Council, i.e., proper utilization living aquatic resources.

But it is, I think, a starting poi certainly not the end. Therefore, I hesitate to stress that the discussion of tec matters should be undertaken always k in mind how these matters could be fina into practice.

In closing, allow me once again tribute to the great kindness of the Gover of Ceylon in making our meeting possible express on behalf of you all our grateful for the painstaking labour of the Orga Committee.

AGENDA FOR THE EIGHTH SESSION OF THE INDO-PACIFIC FISHERIES COUNCIL

siness of the Meeting
. Adoption of Agenda
2 Report on Credentials
3 Nominations
1.31 Technical Committees
1.32 Council Correspondents
atements of Delegations
port of Executive Committee
1 Membership
2 Relations with International & other Organizations
3 Council's Report to FAO
4 Publications and Editorial Policy
5 Financial and Budget Report
6 Implementation of Council Instructions and Recommendations
nendments to the Agreement and Rules Procedure

5. Reports of Technical and Sub-Committees
   5.1 Technical Committee I
   5.2 Technical Committee II
   5.3 Sub-Committee on *Hilsa*
   5.4 Sub-Committee on *Rastrelliger*
   5.5 Sub-Committee on *Chanos*
   5.6 Sub-Committee on Marketing
6. Reports on the Indo-Pacific Fisheries Year
7. Time and Place of 9th Session
8. Election of Chairman and Vice Chairman
9. Symposium for 8th Session
10. Proposals for Symposium for the 9th Session
11. Other Business
    11.1 Principles of Fisheries Policy
    11.2 Terminology in relation to the Council and its Committees

CHAPTER I. COUNCIL PROCEDURE

Opening Ceremony

e Eighth Session of the Indo-Pacific sheries Council was opened by the norable the Minister of Industries & sheries, Mr. P.H. William de Silva in the in auditorium of the Royal College, lombo, at 0930 hours on Monday, 6th cember, 1958.

e Chairman, Dr. K. Kuronuma, in asking e Honorable the Minister to declare the ssion officially open, thanked the Govern- nt of Ceylon for the gracious invitation hold this Session in Colombo and pressed the deep appreciation of the uncil for the arrangements made for the ception of the Delegations and Observers d for the excellent facilities provided.

e Honorable the Minister for Industries d Fisheries in an address recorded in the roduction to this record, officially declared e Eighth Session of the Indo-Pacific sheries Council to be open.

message of greeting to the Council corded in full in the introduction to this cord was received from the Honorable e Prime Minister of Ceylon, Mr. S.W.R.D. Bandaranaike and was transmitted to the Council by the Honorable the Minister for Industries and Fisheries.

5. A message from Dr. B.R. Sen, Director General, Food and Agriculture Organization of the United Nations, was transmitted to the Council by Mr. Thet Su, Deputy Regional Representative of the Director General, FAO Regional Office for Asia and the Far East. Dr. Sen's address is also recorded in the introduction to this record.

6. A message was also received from Dr. D.B. Finn, Director, Fisheries Division, Food and Agriculture Organization of the United Nations and was transmitted by Dr. A.G. Black, FAO Country Representative in Ceylon. Dr. Finn's message is given in the introduction to this record.

7. Before presenting the Chairman's address to the Council, Dr. Kuronuma welcomed the delegation from the Government of the Federation of Malaya and requested the Delegate for the Federation of Malaya, Mr. Soong Min Kong, to convey to his

Government an expression of the Council's sincere pleasure concerning the adherence of the Government of the Federation of Malaya to the Baguio Agreement.

8. In his address to the Council, the Chairman expressed his appreciation of the honor conferred upon him by the Council in electing him for the period 1957-1958.

Noting that 10 years had elapsed sin drafting of the Baguio Agreemen Kuronuma drew attention to the impo of ensuing that fisheries research s clearly identify its problems and ev them in relation to the industry, an that every effort should be made to research results in practice.

STATEMENT FROM MEMBER GOVERNMENTS

9. In presenting the statement on behalf of the Government of Australia, the Delegate indicated that both Commonwealth and State authorities administer fisheries, whaling and pearling, and that in general, legislation concerning these activities is the responsibility of the Commonwealth in extraterritorial waters and of the States in territorial waters and inland fisheries. Fisheries research is maintained by both Commonwealth Government and by some State Departments and Universities. Commonwealth funds have been set aside as a Fisheries Development Trust Account and a development plan for the Papua New Guinea Fisheries has been approved. Australian Fishermen's Cooperatives are an established feature of the industry. The Australian Government follows with interest the work of FAO and IPFC.

10. Welcoming the Delegates to the Eighth Session of the Council, the Delegate for the Government of Ceylon expressed the hope that the occasion would serve to give them first-hand knowledge of Ceylon's fisheries and of the Government's programme for development. Emphasizing the special interest to Ceylon of the deliberations of the Council, it was pointed out that Ceylon imports nearly three times as much fish as she produces and to achieve self-sufficiency in 10 years would require a five-fold increase in local production. Self-sufficiency is the main objective of Ceylon fisheries policy and a program for the amelioration of the lot of the 80,000 fishermen is being developed.

11. Special provision has been made to provide finance for fisheries development including the purchase of mechanized boats and for purchase and repair of modern gear operative Societies can obtain loan four training centers for fishermen operative practice and fishing m have been set up. A Fisherman's pensation Scheme covering death or is already in operation and proposal Fishermens' Provident Fund are consideration.

12. Attention is being given to the constr of houses and roads and improvem the beaching grounds and marke being carried out. Attention is also given to problems of cold storag processing of by-products and other of the secondary phase of the in Development of off-shore and de fisheries is being encouraged. Consi progress has been made in developi inland fisheries by the introduct suitable fish species and plans are implemented to develop brackish fish production. The ancient Pearl has been revived after a lapse of 3 and considerable emphasis is pla research into the problems of the in

13. The Delegate for the Government Republic of France expressed the p of his Government in participatin work of the Council, the work of was of demonstrably great value. phasized the importance of the p contacts between the various spe coming from the member countri expressed the view that the subje sidered by the Council were of interest in the development of the f of the region. The work of p Sessions had made very clear t portance on the standardisation of r

ethods as an essential condition for the liable comparison of the results obtained the various countries. France offered er complete collaboration in the work of ighth Session of the Council.

he Delegate for India briefly reviewed the ork being undertaken in fisheries develop- ent in his country, particularly in relation experimental fisheries, the extension of sh culture projects and the mechaniza- on of fishing craft. Of particular im- rtance was the attention being given by s Government to the training of Govern- ent officers and fishermen. Information rveys in fish marketing were in progress.

India the fisheries survey programs ve been expanded and a Central Board Fisheries, under the chairmanship of the nion Minister of Food and Agriculture, d been set up to coordinate and integrate ograms of fisheries development and search. A Special Expert Committee on sheries Education was conducting an amination of the training requirements, d a high level of cooperation was being aintained between the Union and State vernments, the United Nations speci- zed Agencies, Colombo-Plan, United ates TCM Administration and the Indo- rwegian Project.

viewing the significance of the fisheries dustry in his country, the Delegate for pan paid tribute to the IPFC and the vernment of Ceylon for the arrangements de for the 8th Session of the Council. e fishery industry of Japan was con- nted by many problems, and many rkers were engaged in research and rvey studies to seek solutions to these oblems. The Japanese Government was oviding training facilities in the field of heries for students from many countries the region, and was firmly determined develop and expand these facilities and cooperate to her best ability with other untries to ensure healthy progress of the hery industry of the region.

pressing his pleasure in participating the Eighth Session of the Council, Delegate for the Republic of rea expressed sincere appreciation for e heart-felt hospitality and excellent facilities given by the Government of Ceylon. He said that the Republic of Korea was always conscious of her duty of safe-guarding her national sovereignty and maintaining world freedom and fully realized the importance of the objectives of the Council, assuring the Council of his country's desire to contribute towards the attainment of the Council's objectives.

18. Despite inexperience, hardships and aggression Korea had achieved remarkable and steady development during the past decade. The fishery industry was on the road to recovery through the utilization of modern fishing equipment. Noting that there were still many problems to be solved the Korean Delegate expressed his country's confidence that even more would be accomplished during the coming years and he believed that the deliberations at this Council Session would be fruitful and beneficial to the peace-loving people of the free world.

19. In his statement the Delegate for the Federation of Malaya expressed appreciation for the excellent arrangements made by the Government of Ceylon. Noting that his Government had been closely associated with the work of the Council through the participation in the U.K. Delegations at earlier Sessions, the Delegate said that more than ever Malaya looked to the Council for inspiration and guidance, and promised all cooperation with the Council and its members. Reviewing action taken by his Government to increase fish production, he emphasized the importance of mechanization of fishing craft, the introduction of synthetic fibers, provision of loans to the industry through Cooperatives, the reorganization of fish marketing and the provision of cold storage facilities at strategic points. Work was being undertaken further to develop the inland fisheries both by stocking natural waters and through fish culture. The Delegate for the Federation of Malaya said that his Government was contributing to the cost of the Fish Culture Research Institute in Malacca, and local research staff was being recruited particularly in connection with *Rastrelliger* studies and investigations on the shellfish industry.

20. The Delegate for the Netherlands briefly reviewed the program of work being undertaken through the Fisheries Extension Services in Netherlands New Guinea, including advice and assistance in connection with group fishing practice, operation, maintenance and repair of mechanized fishing boats and the dissemination of information on improved methods of operation of existing fishing gear and the introduction of new materials. The development of fresh-water fisheries was being actively undertaken on a basis of imported species of high food value both for release in natural waters and for fish culture.

21. The Delegate for Thailand expressed his sincere appreciation on behalf of his Government for the opportunity to participate in the present Session in Colombo. Drawing attention to the beneficial aspects of the work of the IPFC, he pointed out that many problems still required solution. His Government was taking active steps in the development of fish culture and the development of systems of management of the inland fishery resources. Thailand had concentrated much effort in developing the sea fisheries through mechanization of fishing craft, the introduction of synthetic fibers and other means. Marketing facilities were being improved but there was still great scope for further exploitation of the marine resources on a rational basis.

22. Thailand was now concerned with an extensive program of oceanographic survey in the Gulf with which was connected plans for a further comprehensive survey to determine the prospects for development of the off-shore fisheries. The Government of Thailand was anxious to cooperate in all possible ways to further the work of the Council and greatly appreciated the action of the Council in helping to develop the *Rastrelliger* Training Center recently conducted in Bangkok. The Delegate expressed the hope that the Council would continue its interest in such training centers as these were powerful tools for use in developing systems of management of the fisheries of the region.

23. The Delegate for the United Kingdo that Her Majesty's Government welcomed the opportunity afforded Sessions of the Indo-Pacific Fis Council for joint discussion of fis problems of the region and for pe contacts between the representatives member governments. Fisheries de ments in Hong Kong were largely direction of exploration and exploita off-shore trawling grounds and the i tion of training programs to q fishermen as skippers, coxswains engineers. Mechanization of the fleet was making rapid strides and th culture of fish was a flourishing in There was an expanding dema cultivated oysters and a comparative export trade in prawns was increasi addition to exploratory fishing, re hydrology and plankton surveys were undertaken by the Fisheries Researc and studies on the biology of praw the effects of industrial pollution shore waters were progressing. Th Delegate also said that marine and water fisheries in Sarawak and Borneo were of great importance economy of these territories and d mental plans were being implem North Borneo is perhaps unique in produces an exportable surplus of products.

24. The Delegate presented a brief re the work undertaken at the Fish Research Station at Malacca, Fed of Malaya, stating that all but el the 82 acres of ponds are now clea in use. The soil of the ponds is i acid, laterite clay of a type commo tropics and experiments are being out on the effect of graduated li dosage to obtain control over the ac the ponds and to determine whethe is any relationship between the li dosage and the fish yield. Stu inorganic fertilizers and vegetation are in progress and preliminary re cross breeding of strains of *Tilap sambica* are producing extremely i ing results.

review of the status of the fishing indus- of Singapore was also given referring rticularly to the development of trawling d the increase in fishing boat mechaniza- n. A mobile fisheries unit providing structions in the maintenance and repair fishing boats was active and a storm- rning service through local radio broad- st had been set up. The training of hool boys in the fishing villages was ing tested through a pilot scheme in der to select apt pupils for further train- g in advanced fishing methods.

pressing his Government's sincere and mpathetic interest in the problems of the gion and assuring the Council of his vernment's view that great benefit is tained from the exchange of scientific formation and through personal contacts, e Delegate for the U.S.A. drew the atten- n of the Council to the fact that American ploratory research in the Central Pacific ean was drawing to a close. The final ploratory project was the oceanographic, logical and tuna survey of the general inity of the Marquesas Islands for which ld the work was complete and the final ports are now being prepared. The search program is shifting to give greater tention to increasing the efficiency of fish- g and the main objectives were predic- n of variations in the tuna resources, the duction of scouting time and the in- easing of fishing efficiency on a basis of na behavior studies and related studies bait fishes.

pressing warm thanks to the Govern- nt of Ceylon for its work in organizing e 8th Session of the Council, the Delegate r Vietnam said that his Government llowed with great interest the Coun- 's activities. In 1957, his Govern- nt had amalgamated the sea and land fisheries services as a depart- nt under the Ministry of National onomy. In its plan for the exploitation aquatic resources his Government at- ched particular importance to material d financial aid to fishermen, the moderni- tion of catching techniques and the echanization of fishing craft. Training fisheries subjects both at home and road was receiving considerable attention and a large credit fund had been reserved for the use of fishermen's cooperatives. Attention was being given to the construction of properly equipped fish harbors and action was being taken to attract capital into the secondary phase of the industry by the development of quality control and the introduction of new processes.

28. The Government of Vietnam was paying close attention to the development of fresh and brackish water fisheries, particularly in connection with *Chanos* and the distribution of fry of fresh water pond fish.

Statements from observer Organizations

29. The South Pacific Commission through its observer informed the Council that it continued to attach great importance to the work of the Council in bringing together people from the same region for discussion and exchange of knowledge which would result in the development of an evaluation of the resources of the region and indicate their developmental potential.

30. The Observer for the Ceylon Association for the Advancement of Science conveyed cordial felicitations to the Council. Recognizing the many services the Indo-Pacific Fisheries Council has rendered, his Association extended its warm congratulations and hoped that the Council deliberations would meet with every success.

31. The Observer for the University of Ceylon conveyed greetings and hoped that the 8th Session of the IPFC would be successful. The University was grateful for the opportunity to be represented at this meeting. The University trains, with the limited facilities at its disposal, fishery biologists, who will eventually aid in the development of the fisheries of Ceylon and has more than a mere academic interest in the deliberations of the I.P.F.C. The discussions at this meeting will help to indicate the lines along which the enormous resources of the Ocean around Ceylon can be most profitably conserved and exploited for the benefit of our people.

32. At the Chairman's request the Secretary read out a letter received from Dr. N.K. Panikkar, Member of the Executive Committee, expressing his regret at being

unable to attend the Eighth Session and wishing the Council every success in its deliberations.

Election of Vice-Chairman

33. As neither the Vice-Chairman, Dr. Tham Ah Kow, nor Executive Committee Member, Dr. N.K. Panikkar, were able to attend, the Chairman requested the Council to take action to elect a Vice-Chairman. Mr. D.T.E.A. de Fonseka was nominated by the Delegate for the Federation of Malaya seconded by the Delegate for France. The Delegate for Australia moved, seconded by the Delegate for U.S.A. that nominations should be closed. This motion having been put and carried, Mr. D.T.E.A. de Fonseka was declared elected Vice-Chairman of the Council.

34. The Delegate for the Republic of Korea gave notice of a proposal for the suspension of the Rules of Procedure, particularly Section VII, paragraph 2 relating to the assumption of duty by the newly-elected Vice-Chairman in order to permit him to assist in the work of the Executive and Steering Committees.

35. This proposal, having been seconded by the Delegate for Australia, was approved by the Council.

Steering Committee

36. The Council constituted a Steering Committee for the conduct of the meeting consisting of :

Chairman of Council
— Dr. K. Kuronuma

Vice Chairman
— Mr. D.T.E.A. de Fonseka

Chairman of Technical Committee I
— Mr. Soong Min Kong

Chairman of Technical Committee II
— Mr. L.F. Tisseverasinghe

Representative of the Ceylon Delegation and Organizing Committee
— Mr. A.S. Mendis

Secretary of the Council
— Mr. J.A. Tubb

Membership

37. The Executive Committee's report in that the membership of the C consisted of 17 Member Governmen Government of the Federation of M having signified its adherence t Council's Agreement in September,

Report on Credentials

38. In accordance with Section III of the of Procedure a report on cred submitted by Delegates and Obser the Eighth Session of the Counc presented.

39. Officially accredited representativ Member Governments participating Council's Session were 12 delega alternates, 25 advisers and 5 e Member Governments on behalf of delegates were present were Au Ceylon, France, India, Japan, Federation of Malaya, Netherlands land, UK, USA and Vietnam.

40. Accredited representatives of the fol observer-organizations were also pre

1. Ceylon Association for the Ad ment of Science
2. Gal Oya Development Board,
3. South Pacific Commission
4. United Nations Technical Ass Board
5. University of Ceylon.

Report of the Executive Committee

41. The Council considered the Report Executive Committee in the light of mendations and comments made submission to the Council from the ad hoc Sub-Committee consisting Garth I. Murphy, Mr. Soong Min and Mr. Tran Van Tri, appointed Chairman to examine the Report.

Relation with FAO

42. The Council noted with appreciati most of the Seventh Session recom tions to FAO had been implement that the liaison maintained wi Fisheries Division had strengthened services of the Technical Secretar G.L. Kesteven, Mr. C. Beever, D Khan, Mr. S.J. Holt, Mr. H. Krist

d Mr. Y. Miyake. It was noted also at liaison had been maintained with e sister organization, the General sheries Council for the Mediterranean, rticularly through the exchange of iblications and information.

e Council expressed its appreciation of e invitation from the Director-General, AO to be represented at the Second World sheries Boat Congress to be held in Rome m 5-10 April, 1959 and expressed interest the World Scientific Meeting on the ology of Sardines to be held in ptember, 1959.

e Council noted with considerable isfaction the interest in its activities pressed by Delegates at the FAO Far st Regional Conference held in Tokyo October, 1958. Specific references to e recommendations of this Conference e given in Chapters 2 and 3.

lations with other Organizations

e Council endorsed action taken by the ecutive Committee and Secretariat in nnection with the Council's relations th other International and National ganizations and recommended that all ssible steps be taken to maintain this stem.

uncil's Report to FAO

e Council endorsed the action taken by e Executive Committee in the preparation d submission of a report to the Food and riculture Organization after the Seventh ssion held at Bandung and recommended at the Secretariat should transmit copies subsequent reports to Member Governnts for information.

plementation of Seventh Session commendations

addition to the comment given the Council dorsed action taken by the Executive mmittee to implement the recommendans of the Council's Seventh Session held Bandung and expressed appreciation to e Secretariat for the work carried out ring the inter-session period.

Documentation for the Eighth Session

48. The council endorsed action taken by the Executive Committee and Secretariat in the preparation and distribution of documents for the Eighth Session but requested that in future every effort should be made to distribute Session Documents as early as possible before the commencement of the Council's Session.

Nomination of Technical Committees

49. The nominations received from Member Governments in respect of Technical Committees I and II and their respective Panels and of the special Sub Committees were accepted by the Council (See Appendix II).

50. Chairman and Rapporteurs of these Technical Committees, Panels and special Sub-Committees are indicated in Appendix II.

Council Correspondents.

51. Nominations for Administrative and Bibliographic Correspondents were received from Member Governments at the commencement of the Session. These remain as for the preceding inter-session period except as indicated in Appendix II.

52. The Delegate for Australia proposed that in view of the FAO program for expanding the coverage and distribution of the Current Bibliography of Fisheries Science, there was no necessity for the Council to continue its bibliographic activities in the field of fisheries biology, marine science and fisheries technology after the meeting of the Ninth Session, and that no further nominations of Bibliographic Correspondents would be sought.

53. This proposal was seconded by the Delegate for France and adopted. The Council also adopted a consequential recommendation that FAO should consider and take action to produce a complete Bibliography covering Fisheries Science, Marine Biology, Statistics, Craft and Gear, Technology, Processing, Marketing and Socio-Economics, and that the organization should take appropriate steps to coordinate their activities in this regard with the United States Fish and Wild Life Service in connection with the publication "Commer-

cial Fisheries Abstracts" and current measures being taken in respect of the American Bibliographies relating to Inland Sports Fisheries.

Technical Committee Meetings

54. On a motion by the Delegate for USA, seconded by the Delegate for India, the Council rccommended that the Secretariat should be instructed to explore ways and means to ensure that the Technical Committees and special Sub-Committees should meet at least once between plenary sessions.

55. In addition to this primary recommendation it was proposed by the Delegate for Vietnam that the possibility of holding sub-regional meetings should be explored.

56. It was agreed that the views of Member Governments should be sought and the Secretary should prepare a digest of these opinions which would be circulated to the Governments concerned.

Reports of Technical and Special Sub-Committees

57. The Council adopted the reports of Technical Committees I and II and the reports of the special Sub-Committees. The resolutions arising from the work of the Committees during the Session were examined in detail by the Delegations in Joint Committee and having been finalized were adopted by the Council in Plenary Session. (See Chapters 2 and 3)

Financial and Budget Report

58. The Council adopted the Statement on Financial and Budget Estimates as submitted in the Executive Committee's Report. It was further decided that a Statement of the Estimated Expenditure of the Council for the period following a proposed Plenary Session should be circulated to Member Governments along with the proposed Agenda for the Plenary Session not less than 60 days in advance of this Session.

59. This estimated expenditure shou annotated giving as far as possi detailed analysis of expenditure und four main items and it should be p out that such expenditure proposals be subject to modification by the C in Plenary Session in accordance further information which might th available for presentation to the C by the Secretariat.

60. The Council adopted a recommen submitted by the ad hoc committ Budget Proposals that, at the next C ence of the FAO, Member Goverr might request FAO to make a d appropriation in respect of IPFC publi and that the members of the Council be advised of FAO's decision as e possible before the next plenary Ses the existence of such an appropriatio Council in Plenary Session should aecide priorities of publication in res Council Documents.

61. The Council recommended that the E Estimate for 1960-61 should be pre to the Director General, FAO.

62. The Council adopted a recommen from the ad hoc committee on E Proposals that the Secretariat shoul ways and means of reducing expen in connection with interpretation s where possible through the employm locally available Interpreters. Pr should nevertheless be made for exper adequate to ensure the employm overseas Interpreters if such local In ters were not available. In additi Council considered that if the propo inter-session Technical Committee ings was acceptable to Member G ments, provision should be made for C expenditure in connection therewit that such expenditure might in prac covered by savings effected b utilization of local interpretation ser

FC Statement of Expenditure for 1958 (January — September)

	Expenditure US $	Budget Allocation 1958/1959 US $
EXECUTIVE COMMITTEE TRAVEL	921.00	3,000.00
IPFC 27th Executive Committee Meeting, Saigon, Vietnam, 21—24 May 1958		
Chairman: Dr. K. Kuronuma (Japan)		
Fares	570.00	
Subsistence	105.00	
Terminals	8.00	
Vice-Chairman: Dr. Tham Ah Kow (U.K. Sing.)		
Fares	160.00	
Subsistence	70.00	
Terminals	8.00	
Member: Dr. N.K. Panikkar (India) — absent —		
PRINTING	879.72	4,000.00
600 copies C.A.B. No. 20	215.52	
„ „ „ No. 21	151.32	
„ „ „ No. 22	117.90	
	484.74	
1,300 copies IPFC procs. 6th Meeting, Sections II and III		
Ind. Rups. 8395-0-0 — 1957 budget = 1368.67		
1958 „ = 394.98		
= US $ 1,763.65		
MEETING (estimate)	2,700.00	2,700.00
8th IPFC Session, Colombo, Ceylon, December 6-22, 1958		
Local expenditure at Colombo, Ceylon	300.00	
Crating of documents, overtime and other incidental expenditure in Bangkok before the meeting	200.00	
Part interpretation services of 2 interpreters (estimate)	2,200.00	
(Costs shared with FAO Conference on Principles and Policies of Land Settlement, Gal Oya)		
MISCELLANEOUS ITEM (up till 30 Sept.).....	529.14	2,000.00
(1) Postage, telegrams	282.71	
(2) Equipment — Stationery and supplies	242.10	
Postage expenses paid on behalf of IPFC by Regional Information Office, New Delhi — Ind. Rups. 20-71 = US $ 4.33		

64. **1959 Program of Expenditure**

The FAO Conference, Rome, November 1957 approved a biennial budget for the Council as follows :

1958-59	A. Travel — Executive Committee	
		US $ 3,000
	B. Printing	4,000
	C. Meeting	2,700
	D. Miscellaneous Expenses	2,000
	Total	US $ 11,700

1959 Programme

65. **Item A. Travel**

Sufficient funds will remain under this head to permit two meetings of the Executive Committee during 1959, savings have been effected due to the inability of Dr. N.K. Panikkar to attend the 27th meeting held in Saigon.

66. **Item B. Printing**

Payments of outstanding charges in respect of the 6th Proceedings have been met largely by funds carried over from 1957, but approximately US $500 will have to be drawn from the 1958-59 allocation to finalize the accounts.

67. Printing of the 7th Proceedings, now in progress will cost approximately US $ 2,500, including distribution costs, and four issues of the Current Affairs Bulletin during 1959 will cost approximately US $ 500, leaving an anticipated balance of US $500 to meet the cost of printing of part of the Proceedings of this (8th) Session. Publication of the remaining part may therefore have to be deferred until the next budget period.

68. **Item C. Meetings**

It is anticipated that costs chargeable against the Colombo Session will approximate US $500, the remaining sum of US $2,200 will be required to meet the costs of the French-English interpretation service, covering 2 persons for approximately 16 days @ US $35.00 per diem plus single fares Colombo-Geneva. As no session of Council will be convened during 1959, there will be no expenditure under this head.

69. **Item D. Miscellaneous Expenses**

This item is fairly stable from year to year and covers postage, telegram and cable charges, stationery and a small amount of office equipment.

70. **Proposed Budget Estimate 1960-61**

	A. Travel — Executive Committe	
		US $
	B. Printing	
	C. Meetings	
	D. Miscellaneous Expenses	
		US $

71. **Item A. Travel**

Provision is made for one Exe Committee Meeting during 1960 an during 1961. Expenses for payme per diem to members of the Exe Committee during pre-and post S meetings are included.

72. **Item B. Printing**

Provision is made as follows :

Outstanding commitment	
8th Session Proc.	US$
Printing & Distribution,	
9th Session Proc.	
C.A.B., 8 issues 1960-61	
Total	US $

73. No provision has been made for the pr & distribution of Special Publica Handbooks and Manuals, nor of repr the Council's Agreement and Rul Procedure as amended. The availabi such material for printing will depe large measure upon the distribution workload during 1959-1961 at Fis Division, FAO. The advice of the Di has been sought on this matter.

74. **Item C. Meetings**

As for 1958-59, direct expenditu relation to the meeting is estimated $ 500 and that for interpretation se at US $ 2,200.

75. **Item D. Miscellaneous Expenditure**

As indicated above, no charge in thi need be anticipated.

Council's Symposium

76. The Council adopted the report o Eighth Session Symposium "Fish Be with particular reference to Pelagic Sh Species" by the Convener, Dr.

amanney, noting that the results of udies on fish behavior were applicable the industry through the development fishing equipment and increasing the ch efficiency of existing fishing equipnt, through the location of fish concentions and through the formulation of nagement programs. Fisheries Biolosts still lack much of the ordinary herman's knowledge of fish behavior d accurate field observations properly corded should be made. Care should be ken that conclusions in relation to fish havior under natural conditions should t be based solely upon observations made fish in aquaria.

ter considering recommendations receid from the Technical Committees. the uncil decided that the Symposium subject the Ninth Session should be "How to rmulate programs of fisheries research d technological improvements particuly in fish handling required for the plementation of national policies for heries development, and methods of sessing progress on these programs". . D.J. Gates (Australia) was elected nvener.

nendments to the Agreement

e Council adopted the proposal by the vernment of India of an amendment to e Agreement to permit the Council's enary Sessions to be held at intervals of o years. The proposal was seconded by e Delegate for Ceylon and the voting was follows: 11 delegations in favor; 1 ainst, with two communications in favor ceived in writing by the Secretariat; countries abstained from communicating eir opinions to the Council. The 13 votes favor of the amendment gave the quired majority.

e Delegate for the Netherlands tabled a posed amendment of the Agreement ich would permit future amendments of e Agreement to be passed on a basis of a o thirds majority of Member Governments presented at a Session. The Secretary s instructed to circularize Member vernments to this matter.

Organization of the Council's Work

80. The Council adopted a recommendation submitted by the Delegate for France that Member Governments should include in their official opening Statements a list of the important problems, given in the order of priority that each country would like to see assigned to them by the Council; that these opening Statements should be transmitted to the Secretariat at least 60 days before the forthcoming Council Session; that the program of work of the Technical Committees should be based on these lists of problems together with the recommendations from the previous Session and that provisional programs including these two features should be submitted to the Council in Plenary Session.

81. The Council resolved that in view of the fact that much of the Council's work is of a continuing nature, it is felt desirable that Delegations from Member Governments should include at least one member who has had previous experience in Council Sessions. Member Governments are accordingly requested to give consideration to this matter when the question of appointing delegations to attend Council Plenary Sessions or Technical Meetings is under review.

82. In further discussing the recommendation set out in paragraph 54 of this chapter, the Council accepted the recommendation from the Delegate from India that the proposal should be forwarded to Member Governments of the Council with indication of the administrative and financial implications. The Council requested that the views of Member Governments should be presented at the 9th Session of the Council.

83. The Council directed the Secretary to explore the possibility of arranging for meetings of the Technical Committees to commence a few days in advance of the first plenary meeting of each Council Session in order to review work and finalize the report on the Technical Committees activities conducted during the inter-session period.

84. The Council considered that this procedure would enable the Committees to give more detailed attention to the items on their respective agendas during the Council Session and in this way, increase the efficiency of the Committees operations.

85. In connection with the coordination of work of the Technical Committees and Panels and to ensure continuity through the inter-session period and the succeeding session, the Council recommended for the attention of FAO that each Technical Secretary should be present at successive sessions of the Council. If this could not be arranged, then it would be advantageous if the Staff Member assigned as Technical Secretary for any inter-session period could be present at the following session.

86. The Council placed particular emphasis on the need for continuity of representation and strongly urged Member Governments to give serious consideration to the two proposals set out above.

87. The Council recommended that the organization of the Technical Committees into panels should continue as for previous sessions and inter-session periods. It further recommended that the ad hoc committees on *Rastrelliger*, *Hilsa*, Fish Culture in Rice Fields and Marketing should be reconstituted to operate during the inter-session period and the 9th Session of the Council.

88. The Council further decided that in order to clarify the position of the Technical Secretaires, the special ad hoc Sub-Committees should be considered as operating under the aegis of the particular Technical Committee to which their subject matter had an obvious bias and that reports and recommendations from these Sub-Committees derived during a Council Session should be included in the report of the appropriate Technical Committee. Having been presented to the Council in Plenary Session these reports should be regarded, for the purpose of Rules of Procedure, Section X, para 3, as having been presented through the Executive Committee.

89. The Council recognized the part requirements of biologists in the fiel tistics and recommended that at th Plenary Session, Technical Commi should appoint two biologists who participate in discussions of Tec Committee II, Panel C, on stat matters.

90. On the matter of correspondence d the inter-session period, the Council r mended that copies of all docu distributed or exchanged should be available in sufficient numbers at session for the use of new Com members.

91. The Delegate for Vietnam propo recommendation, which was accept the Council, that Delegates on return their respective countries, should emp particularly one or more of the Co recommendations which they co would be implemented by their G ments and they should particularly authorization and means to impl these selected recommendations.

Time and Place of Ninth Session

92. No invitation having been received Member Governments, the matter refered to the Executive Committee in dance with the provisions of the Ru Procedure, Section II. The Council ad a recommendation that the Ninth S should be held during the last quar 1960.

Election of Chairman and Vice Chair

93. On the nomination of the Delega Korea seconded by the Delegat Federation of Malaya, Mr. Tran Va (Viet Nam) was elected Chairman Council for the inter-session perio the next succeeding Session.

Participation in International Meetin

94. The Council noted that included in C58/WP 22, Schedule of Meeting of In to IPFC, were meetings in which the C could profitably participate through a ment of observers wherever possibl this regard the Council directe Secretariat to circularize the M Governments with the reports of observers including a list of docu

sented and discussed at the concerned etings. Member Governments could then ectly contact the organizers of the etings to obtain documents in which y might be interested.

nciples of Fisheries Policy

e Council agreed that there was need to ine the basic principles for the formula- n of fisheries policy and requested the retariat to prepare a questionnaire on s subject for consideration by Member vernments and on a basis of the replies his questionnaire, Occasional Paper 57/3 l Addenda and such other information could be made available, to prepare for mission to Member Governments.

o-Pacific Fisheries Year

e Council decided that the concept of a articular year" be dropped from consi- ation. In so doing, the Council expres- l its adherence to the basic philosophy the Indo-Pacific Fisheries Year, namely, t the collection of adequate statistics is urgent matter, and should be pursued th all possible speed by Member Govern- nts.

rmal Resolutions of Thanks

a motion by the Delegate for KOREA e Council adopted a resolution as follows:

"That the Council records its grateful appreciation of the generous hospitality and the excellent facilities which have been so graciously extended by the Government and people of Ceylon to the Council, to the Delegations from Member Governments and to other participants attending the Eighth Session and directs that this expression of appreciation be formally communicated to the Prime Minister of Ceylon".

a motion by the Delegate for VIETNAM e Council adopted a resolution as follows:

"Le conseil exprime ses sincères remerciements à Son Excellence le Ministre des Industries et des Pêches, Mr. P.H. William de Silva, d'avoir honoré de sa présence les ceremonies de l' inauguration de la 8ème Session de l'IPFC, ainsi qu' au personnel du Ministère des Industries et des Pêches de son assistance et de sa collaboration durant les seánces dudit Conseil".

99. The Delegate for UNITED KINGDOM proposed and the Council adopted the following resolution:

> "The Council desires to place on record an expression of its very sincere appreciation of the excellent arrangements made and the facilities provided for the Council's Session by the Organizing Committee and also to record most grateful thanks on behalf of the Council and the individual members participating in the Eighth Session, for the personal assistance, hospitality and close attention to their well-being by the individual members of the Organizing Committee."

100. The Delegate for FEDERATION OF MALAYA proposed and the Council adopted a vote of sincere appreciation to the Principal and Registrar of the Royal College, Colombo, for their generous action in making available for the use of the Council the entirely satisfactory accommodation within the College.

101. The Delegate for THAILAND proposed and the Council adopted a hearty vote of thanks to Dr. Katsuzo Kuronuma for his excellent service to the Council as Chairman and for the painstaking attention which he has devoted to the affairs of the Council since the Seventh Session in Bandung.

102. The Delegate for FRANCE proposed and the Council adopted;

> "que nous votions des remerciements au Directeur General de l'Organisation pour l'Alimentation et l'Agriculture pour l'interêt profond et continu qu'il a montré envers les affaires du Conseil. Je propose aussi que nous votions dans le même sens vis-a-vis des personnes de la Division des Pêches dela FAO qui ont fait fonction de Secrétaires Techniques pendant la periode d'inter-session et durant la huitième session, fonctions qu'ils ont si bien remplies et qui ont étési precieuses au Conseil."

103. The Delegate for UNITED STATES OF AMERICA proposed and the Council adopted a Vote of Appreciation for the services of the Council's Secretariat and for the manner in which the instructions of the Council had been carried out and for the servicing of the Eighth Session. Attention was drawn particularly very valuable and efficient service re to the Council by local Secretariat per assigned to assist the Council's Secr by the Ceylon Department of Ind and Fisheries.

CHAPTER 2. - RESOURCES

The Council reviewed the recommendations made by the Seventh Session of the Council with respect to the subjects assigned to Technical Committee I. For each topic account was taken of the progress of work reported in Working Paper 18 (which records the correspondence between committee members in the inter-session period), and in the relevant documents (Working Papers, Technical Papers and Contributed Publications) before the Council, and also reported verbally by the members of the Committee. The further actions recommended on the basis of this review are described below, together with decisions regarding new topics and proposals discussed by the Council. Technical Committee I attempted, as requested by the Chairman, to relate discussions closely to the practical problems confronting industry and governments, and would wish to do this more systematically at future sessions, on the basis of the identification by Delegations of their countries' main problems.

Reference Books

The Council examined the draft of a section of the "Handbook of Field Methods in Fisheries Biology" prepared by FAO Fisheries Biology Branch, and suggested that although it is useful for such a book to contain accounts of most well-tried methods, it should also give an indication of which method of several available for the same purpose is recommended for general use, and might be adopted as a standard, at least provisionally. The account of standard methods of water analysis circulated by FAO to the committee during the inter-session period, for comment, is very helpful; it be generally distributed, and might f pattern for accounts of methods in othe It was suggested that consideration be gi the authors of such accounts to the desi of beginning each with an introductor tion dealing with the means of att particular problems, and grouping to the set of methods used in attempting t each problem.

The Council was informed of p made by FAO in preparation of other ations of methods, and discussed the pro by which mimeographed drafts could be re by the Council so that amendments mi suggested which would make them c more closely to the Council's require It has been suggested that the Editor for technical reviewing, enlist the aid qualified and experienced persons in eac wherever they might be, and then, whe suggestions have been incorporated in th the revised draft should be submitted Chairman of the Council who would requ each book, a person or group of persons, w within the Region, to study the draf regard to its suitability for use by the C and advise him accordingly. These sugg would then be forwarded to the Edi incorporation in the published version withstanding the statement to the c contained in the Summary Report of Session of the Council, the Committee to record its unanimous belief that, such ations of methods should be called "Manua

d further confusion the term "Handbooks" lied to compilations of results, as is the n usage. Combinations of the two might erred to as "Reference Books".

ge determination of fish

he Council noted the difficulties involved determination of fishes in the tropics. ie instances, however, there are annual i-annual changes in the environment of nt magnitude to cause check marks in parts. Research workers are urged to dvantage of these whenever possible.

he Committee also noted the possibility ducting studies on population dynamics t determining the age of the fishes. nce is made to the report on the *liger* Training Center (Working Paper 28) or further details. Finally the Council the possibility of determining the age on basis of changes in body proportion ge.

he Council noted with interest that FAO emplating preparation of a general review question of age determination. The l recommends that Biology Branch, es Division, Rome, be requested to l with all possible speed in the prepar- f a review with particular reference to l problems and recommends that the include the following:-

I. Definition and discussion of the applications of age and growth data to practical fishery problems.

II. Discussions of all possible methods of age determination in the tropics.

II. With reference to (1) above descriptions of alternate methods of solving problems that normally require age and growth data for their solution.

V. Clear definitions of areas for further scientific investigation looking towards solution of the basic problems. These will serve as guides to the scientific programs of the several member countries.

The Council awaits with interest the tion of the report. It is hoped that r nations will report results in this area r research is completed.

Standardization of Plankton Nets

The Council noted with pleasure that UNESCO had made available a grant sufficient to cover the cost of 12 Marutoku B—type zooplankton nets. The Secretary was instructed to obtain these nets and send one to each member country which is not already in possession of such a net, and which will be able to use it, either for comparison with other kinds of gear during the next inter-session period or, lacking such other gear, to begin plankton survey. The nets should be sent directly to the persons at addresses listed below, together with an explanation of the recommended mode of use.

AUSTRALIA	- Mr. O.J. Tranter, CSIRO, Cronulla, Sydney.
CEYLON	- Director of Fisheries, Fisheries Research Station, Galle Face, Colombo.
FRANCE	- Mr. Legand, Institut Français d'Océanie, B.P. No. 4, Noumea, New Caledonia.
INDIA	- Dr. S. Jones, Chief Research Officer, Central Marine Fisheries Station, Mandapam Camp, South India.
INDONESIA	- (Secretary to ascertain from Committee Member).
FEDERATION OF MALAYA	- Director of Fisheries, Department of Fisheries, Penang, Malaya.
NETHERLANDS	- Dr. J. Verwey, Director, Zoologsch Station, Den Helder, Netherlands. (Alternative: Dr. K. Vaas, Leiden or Prof. G.B. Baerends, Groningen).
PAKISTAN	- (Secretary to ascertain from Committee Member).
UNITED KINGDOM	- Director, Fisheries Research Unit, University of Hong-Kong.
VIETNAM	- M. le Directeur des Pêches du Vietnam, 116 Rue Phan Dinh Phung, Saigon.

The Council recommends that Marutoku B—type nets be used during the period between the 8th and 9th Sessions of the Council to conduct experiments designed to obtain comparative data regarding the effectiveness of different kinds of plankton nets in

catching zooplankton organisms, fish eggs and also fish larvae. The results of such experiments should be reported to the 9th Session, at which time the next step in standardization of sampling gear should be discussed.

At least one comparative experiment should be conducted with the Marutoku B— net and each other kind of net in use by each country. In particular comparisons should be made with the Clarke—Bumpus net (adopted by Australia, France and New Zealand for TASMAPAC and subsequent cooperative investigations in the South Pacific) the one meter net used by POFI, the Hensen net used in the Philippines and elsewhere, and the Discovery net used in Hong Kong.

In each experiment a minimum of 10 stations should be worked. At each station two normal hauls should be made with each net, from bottom to surface or, in deeper water, from 150 m. to surface. The haul with the Marutoku B—type net should be vertical, and at a speed within the range 0.4 to 2.0 m/sec. and preferably 0.6 to 1m/sec.

Results should be presented as mean total number of fish eggs, total number of fish larvae and total displacement volume of plankton (excluding any organisms exceeding 1 cm. in length, which should be recorded separately) in each replicate pair of hauls for each net at each station, expressed both as per m^3 of water filtered and as per m^2 surface of water column.

Information about each comparison should include at least station position, date and time of haul, weather conditions and depth of water.

The method of treatment of the catches (removal from net, preservation, sorting, estimation of displacement volume) will be described by the committee member for Japan in a note which he has undertaken to prepare and circulate, and which will follow the procedure commonly used in that country.

Member countries, such as the Philippines and U.S.A. who are already in possession of comparative data, are requested to submit an analysis of them to the 9th Session of the Council.

The Council decided to make no recommendations regarding gear specifically for sampling fish larvae and phytoplankton the results of the trials with the zoopl nets are avaliable.

The Council endorsed the recommen of the *Rastrelliger* Training Center (W Paper 28) that full advantage be taken possibilities of cooperation with comm vessels of all kinds in obtaining infor about plankton abundance. It is recomm that FAO should make available prototy the simple modification of the Hardy Pl Indicator, in order that countries opportunities to arrange for the use o a gear by fishing vessels or other cra construct copies of it locally.

Identification of fish and plankto

The Council noted with pleasure th member countries have now published lists of fishes, and others have them complete. The Council urged membe have either not published lists so far, c revised their earlier lists to submit copie Biology Branch of FAO Fisheries D The Council also requests the Fisheries D of FAO to publish its proposed che (which should include names of all comm important aquatic animals) at least i form, before the 9th Session of the Cou

The Council discussed the need fo trated keys for important plankton spe the region. Pending the publication keys by countries having the staff and fa for this work, the Delegate for the undertook to arrange for preparation short annotated list of references to a publications useful for plankton identif and to circulate it to the members Council.

It is hoped that the Council will to use its good offices to assist workers in member countries in finding means of their identifications checked. The D for the Netherlands suggested that experiencing difficulties in the identi of freshwater forms might contact the gical Laboratory of the University of

Population dynamics

The Council reaffirmed the import methods of assessing the relations betw stocks, the yields obtained from them a methods and intensity of fishing, and rec

e of these methods in providing a focal for biological, and technical studies of industries. It believes that the proposed ournal of Population Dynamics would stimulate research in this field and te the exchange of ideas between scien- igaged in it.

he Council looks forward to the early tion of the report and papers of the Scientific meeting of ICNAF, ICES and n Lisbon 1957, and noted progress in tion studies reported by some member es, all of which are requested to continue m the Council of their work on fishing ock assessments, and particularly with to river populations and cultivated stocks.

sh culture in general

eneral reports on this topic, which was ed at length were received from Malaya, d and U.S.A. The Council stressed the ance of fish culture research in the region commends that Member Governments ed to consider how the work of the l might be made more effective in this d make proposals in this respect for con- ion at the 9th Session of the Council. ution by FAO of the review by E.D. Le n the application of science to inland s is awaited with interest.

urnal feeding rhythms

was noted that no further work on this , to which the Seventh Session of the l had made particular reference under neral heading of fish culture, had been out. The Council is of the opinion is not of such importance as to warrant cial attention, and does not, therefore, end further action with respect to it mbers of the Council.

oil composition in fish ponds

is understood that the draft of a paper subject by A.G. Wurtz of France has mpleted and the committee looks forward ublication.

he Council reviewed the report on the done by India and noted the work on oils carried out at the Fish Culture ch Station, Malacca, reported in the g statement of the U.K. Delegation. vestigation of soil structure and compo- sition in relation to fish production is important, but it requires highly specialized techniques and equipment, so that several member countries are not able to undertake such studies at the present time. The Council urges that India continues its work in this field and requests that the results obtained, together with information about techniques used, be reported to the 9th Session of the Council.

Problems arising from the Introduction of Non-Indigenous Fishes

The Council recognized that the present subject extended to undesirable fish, whether indigenous or non-indigenous. The spawn taking of Chinese-carp successfully carried out in Japan during 1957 and 1958 took the attention of the Council which also noted the problems arising in the area particularly concerning *Tilapia mossambica* and common carp *(Cyprinus carpio)*.

Rigid control of the introduction of non-indigenous species is considered necessary, and adequate research should precede action in this matter. A statement on this subject by the Australian Delegate stated that the introduction of aquarium fish is becoming increasingly important in Papua/New Guinea and the information available on habits is insufficient to ensure that the fish, if liberated in natural waters, will not become a serious menace to other aquatic forms of life-for example, *Lebistes* is described as a harmless fish with potential as a biological control for mosquitoes. However, it is known to attack small fish of good edible varieties and therefore could be termed noxious.

In tightening up control by the Australian Government of introduction of exotic species, the following varieties have recently been excluded from import licences granted in the Territory of Papua/New Guinea:—

Millions Fish	*Lebistes reticulatus*
Bumble Bees	*Brachygobius doriae*
Angel Fish	*Pterophyllum spp.*
Black Tetras	*Gymnocorymbus ternetzi*
Lamp Eyes	*Aplocheilichthys microphthalmus*
Penguins	*Thayeria obliqua*

Although these varieties which can be imported from New South Wales into the Territory may be harmless in temperate climates, in tropical Australia and New Guinea they

may be considered a menace to natural waters. More information on these species and other exotic varieties would enable regulations to be planned more satisfactorily. Member countries are requested to submit relevant data to the Secretariat for the information of countries concerned.

The Council recommends to Member Governments that:

i. considerable research should be carried out before any legislation in respect of introduction of non-indigenous species of fish is enacted.

ii. research on *Tilapia mossambica* should be continued, both in fish-ponds and natural bodies of water, and the results reported to the next Council Session.

iii. where possible research should be undertaken on common carp *(Cyprinus carpio)* with particular attention to specification of the varieties dealt with and the countries from which they originated, with the aim of finding criteria to determine which variety is most suitable for particular habitats. The results should be reported to the next Council Session.

vi. research should be continued on the spawning of Chinese Carp, with special reference to the production of their fry.

Weed Control

The Council reviewed the status of the question in various member countries. Aquatic weed control does not appear to be a serious problem in Japan and Vietnam but may be of local significance in Malaya, Ceylon, India and U.S.A. In India the choking of inland water areas with aquatic weeds has considerably retarded the progress of fisheries development.

The Council recommends that further work be carried out to evolve a suitable and economic method of controlling growth of weeds in fish ponds. Interested Member Governments may study further or examine whether the grass carp *(Ctenopharyngodon idellus)* would be useful in keeping down the growth of submerged aquatic weeds in their countries.

Member Governments are reques continue to report to the Council the of their work in this field until such t the Council considers the time is appr for a further general review of the matte

Stocking of natural swamps and economically unproductive waters

No new documents were available Council relating to the proposal made 7th Session of the Council to encourage s with hardy local species such as *javanicus* as a preliminary step in dev freshwater fisheries in these areas.

The council was informed however Malaya, where *P. javanicus* is becon popular culture species, stocking of por mining pools after removal of predatory with insecticides, has been initiated, th is too early to say whether this rough s will be entirely successful.

In Ceylon stocking with *Trich pectoralis* in swampy low-lying areas, irr canals and ditches leading to paddy fie in some areas been successful. Rough s with *Tilapia mossambica* has also been suc in certain village tanks.

The results of the activities me above, and of other experience with stocking, should continue to be repo the Council.

Fish Culture in Rice Fields

Considering the importance of this for increasing the production of freshwa in the Region, as well as the inad of information on the subject obtained h the Council deems it desirable to see th Field Fish Culture Sub-Committee streng through the effective participating in i of other member countries at present pr rice field culture, and proposed that the tary be instructed to solicit nominatio the Member Governments concerne Council reaffirmed the recommendations at the 7th Session relating to the main pr on which methods of rice fields fish should be based, the effect of insectic fish and the inter-action of rice and the influence of rice on the growth the influence of fish on rice yield. The noted that documents were before it

l action with respect to all three items, shed now to place priority on obtaining tion concerning the comparison of fish e production in paddy fields.

ıe Council would again draw the attention to the inter-dependence, in countries rice field fish culture is practised, problems of rice cultivation and fish Progress is possible only where ations dealing with rice cultivation and lture, respectively, work hand in hand the national and the international levels.

r. Le Van Dang (Vietnam) was elected an of the Sub-committee and asked to e initiative in obtaining replies to the nnaire which had been circulated in the ıter-session period. Members of the nmittee were asked to cooperate with nvenor in this task and the Council ıended that delegates, in their reports r governments, should make special ı of this matter.

ıtrition of fish under cultivation

was noted that although FAO had not ble yet to prepare the comprehensive of this subject requested by the 7th , it hoped to do so during the next ssion period. The Council attaches rable importance to this topic, but e of its complex character the particular of nutritive values of different foods to lar fish species was selected as that to work in the next inter-session period be directed. The nutritive value is ed in terms of growth of fish or yield d and should be considered in relation composition of the food, and the choice able foods to be encouraged in the environment, or to be stocked or given lly. Papers on nutritive value of natural tificial foods and quantities eaten by ed fish are solicited for the 9th Session Council. It is believed that discussion 9th Session should not only clarify a of direct interest to the Council, but contribute to the preparatory work for eting on broader aspects of fish nutrition FAO proposes to convene in 1961.

ıanos

he report of the Chanos Sub-committee niques of reducing fry mortality requested 7th Session of the Council had not been prepared. From the documents submitted it appeared that there already exists a considerable body of knowledge about this subject, but more active steps need to be taken by extension services to inform operators about such techniques and apply the experimental results in practice.

The synopsis prepared by Mr. Schuster at the request of FAO was welcomed and it is hoped that after any necessary revision this would be published. The Council was sorry to note that information is still lacking concerning *Chanos* research and cultivation in Taiwan.

Member Governments are requested to submit reports on new developments in *Chanos* fisheries to the 9th Session of the Council. It was decided, however, to suspend the activities of the Chanos Sub-committee pending promulgation by the Council of a plan of action with regard to the broad problems of fish culture, as suggested under that general heading in this report.

River-basin Development

The Council considered the present status of the problem in different member countries and the Delegate from Japan emphasized its importance. Particularly in Malaya and India, tree stumps in their beds have considerably retarded the development and exploitation of fisheries in reservoirs. The Delegate from Vietnam stated that Thailand, Cambodia and Vietnam, having contiguous waters, construction of barrages in one country would affect the riverine fisheries of others. It was observed that in U.S.A. there is comprehensive legislation to the effect that it is obligatory on the part of the river valley projects to provide necessary funds for development and protection of fisheries in the rivers.

The Council recommends that Member Governments be apprised of the importance of this problem. Surveys should be carried out on notice being given of impending construction of dams, and the sites should be cleared before water is allowed to accumulate, in order to facilitate subsequent exploitation of the reservoir. The Council stressed the need for continuing biological surveys after the completion of the project. Legislation should in each case be enacted to ensure that such surveys are carried out, that their costs are borne by the Development Authority and that

recommendations arising from them are given due and proper consideration. The results of such surveys should provide the basis of action by the Government Agency concerned, designed to protect existing fisheries or develop new ones. The attention of Governments and International Agencies concerned is drawn for example, to this need with respect to the Lower Mekong Basin Development Project, which will affect the fisheries of four countries.

Water Pollution

The Council discussed the problem of pollution resulting from mining operations, manufacturing industries, agricultural use of insecticides, town sewage and discharge of oil and other wastes from vessels and the adverse effects of these on inland and coastal fisheries in several member countries. Although the problem is not very acute at the present moment, the danger is increasing and the Council apprehends that it will assume serious proportions in the near future in view of the increasing technical developments in member countries. It is therefore necessary to protect the interest of fisheries well in time, and the Council recommends that Member Governments be urged to take early steps to enact legislative measures to this end.

Hilsa

Hilsa forms an important commercial fishery in Burma, India and Pakistan. The Indian Delegate drew the Council's attention to the status and the problems of *Hilsa* fisheries in his country and also the work that is now being carried out by the National *Hilsa* Research Unit. Studies of age and size composition, of the stage of maturity and of morphometric and meristic characters in large samples of *Hilsa* from all river systems and the Saurashtra coast are being conducted. Tagging experiments are also in progress. Catch statistics in respect of *Hilsa* fisheries are being collected from different regions. The Council observed that Pakistan has also undertaken studies on the *Hilsa* fisheries. So far as known there had been no progress in Burma on this problem and the Council proposed that Burma might reconsider setting up a research unit at an early date.

It is proposed that the Hilsa Sub-Committee should continue its work along the lines laid down at previous Council Sessions.

The need is stressed for close between the workers of the member co concerned to ensure adoption of uniform n and techniques in *Hilsa* investigations. nical papers and reports on the subj solicited for discussion at the next Ses the Council.

Rastrelliger

The Council was pleased to note request that FAO should arrange a S to train technical officers had been imple by the conduct of an International T Center on the Methodology and Techni Research on Mackerel *Rastrelliger* the of which was presented to the Committ

It is recommended that member co fishing for *Rastrelliger* implement witho the proposals contained therein for s techniques of research on *Rastrelliger* Council noted that these proposals are consistent with Article III of the Agreement.

All member countries, and especial having important fisheries or conducting n on mackerels, are requested to study th general recommendations (other than dealing with subjects covered by s proposals in this report) contained in th of the Training Center and report on th bility of their implementation to t Session of the Council.

Certain recommendations from the T Center are for action by FAO, and it i that FAO will be able to undertake this

Particular attention is drawn to the n that participating countries should send of their length sampling operations Council's Secretariat for compilation and ation in suitable manner. The form g the Training Center Report should be u this purpose.

The Rastrelliger Sub-Committee Mr. Sant Bandhukul (Thailand) as Conv the next inter-session period and the S sion of the Council. He, with the Te Secretary, was requested to do eve possible to draw the attention of the and institutions concerned to the p methods, encourage their adoption, foll development of *Rastrelliger* research and for prepartion of a comprehensive re

lementation of the recommendations, to ented to the 9th Session of the Council. nbers of the Rastrelliger Sub-Committee d to cooperate in this task, and Member nents are requested to facilitate their

ıe Council noted that the Training would have benefited by the participation ntists from Member Countries fishing ckerels other than *Rastrelliger* species. courage wider participation in the ment of methods of research in this is proposed that the terms of reference Sub-committee be broadened to include *ıbroid* fish, and that its title be modified ngly.

ıe Council believes that the need will future for further opportunities of revi- progress in this work, especially as programs are only just now starting e of the participating countries. It is ended, therefore, that consideration be y the member countries and by FAO to means by which research workers, ng for continuity, at least some of the ants in the Center), can in about three me meet to appraise the results obtained e application of the proposed techniques y. Such a meeting should be conducted orkshop at which results would be d and analyzed further if necessary.

is important that all workers concerned *strelliger* research be informed, directly detail, about the decisions of the in this matter. It is therefore recom- that the report of the Training Center, he relevant Sections of this report d, be published by FAO as soon as and widely distributed within the It should also be sent to interested elsewhere, particularly those concerned ombroid fishes.

ugil

progress was reported in the reviewing status of work on this group and g a program of action by the Council spect to it. The Committee urges the teur for this topic (Mr. J.D. Bromhall, Kong) to complete his synopsis as soon ible and circulate it to members of al Committee I before the 9th Session of the Council so that they may propose appropriate action by the Council at that time. The Council noted with considerable interest the early results of experiments on artificial breeding of *Mugil* in Korea and solicits further reports at the 9th Session.

National resources for the study of basic productivity of the sea

Work has been done in this field during the past inter-session period by Australia, France, Japan and the U.S.A. Among the ways of measuring primary production the Council noted that the Carbon-14 technique is the only one which could at present be used by other member countries, because it is cheap, and skilled experts are not needed for the field work, nor complex instruments for the analysis, since central agencies can now supply standard materials and provide a counting service. In the Indo-Pacific Region two important ways of practising the technique are already in use—one in Hawaii, one in Australia and both in New Caledonia.

France proposed to compare these techniques, and to work on standardization of one or several of them, in New Caledonia by using Stiemann Nielsen's method with materials from the International Agency in Copenhagen as a reference, provided that funds could be made available for this purpose. It is hoped that a small grant might be obtained from UNESCO or another organization to facilitate this work. The Council noted that the Symposium on Methods of Measuring Primary Production at Bergen in 1957, was unable to suggest standard methods. In these circumstances the Council recommends that Member Governments having facilities and staff available at present for this work continue it and report their progress at the 9th Council Meeting, in particular those aspects which bear on the problems of standardizing the method for routine use.

Faunal Changes

This item was considered and deleted from the list of topics for future action as it had been adequately dealt with in other portions of the report.

The Council noted, however, that it was difficult to consider the topic without adequately detailed catch statistics. Such statistics are basic in all programs of fisheries research,

development and management as well as being vital to economists and others.

The Council, therefore, decided that, during the Ninth Session, two members of Technical Committee I would be asked to join Panel C of Technical Committee II during discussions on statistics. Arising from the joint discussions which would give adequate recognition to the special requirements of fisheries biology in the preparation of statistical programs, the Council might then be in a position to establish a more comprehensive procedure in relation to its work in this field.

Trawling

The Council noted that experimental and commercial trawling is being undertaken by many member countries and recommended strongly that size compositions of the catches of the main species be always recorded, in order to form a basis for stock assessments and future research.

Oceanography

It was noted that Japan, Australia, France and U.S.A. have published their oceanographic data and distributed them in the region. The Fisheries Research Unit of Hong Kong University has accumulated files of hydrographic data since 1954 from surveys in the territorial waters, and in the shelf region in a sector one hundred miles off shore from Hong Kong, to study the influence of the discharge of the Pearl River; consideration will be given by the Hong Kong Fisheries Research Unit, to the possibility of publishing these data in mimeograph form for distribution. The Secretary was instructed to enquire from member countries what other data are in existence and which have not been published or exchanged between member countries, and to report on the possible ways through which dissemination of this data to intended parties could be achieved. Due consideration should be given to the discussions taking place outside this Council with regard to the compilation of oceanographic data on a world basis, and the Secretary is asked to prepare a report on progress in this field for consideration at the 9th Session of the Council.

Tuna

Except in France, Japan and the United States, where ambitious programs of study on tuna biology have been undertaken the progress in other countries is not consid
The tuna fishery is being expanded in Au
where a biologist has been appointed t
on tuna. The Council noted that in
exploratory fishing for tuna in off shore
is to be carried out by a Colombo Plan
The Council recommends that Member co
continue to report to the Council new d
ments in the status of tuna fisheri
research, and reaffirms its recommen
that the one-degree square should be th
unit for the collection and presentation
catch statistics.

Sardines

The Council had previously been in
of the World Scientific Meeting on the
of Sardines and Related Species to be co
by FAO at Rome in the autumn of 19
it had before it the operational plan
meeting. The Council was asked to
an author for a species synopsis for *Sa*
in the tropical eastern Indo-Pacif
suggested the name of Mr. Li Kwan
It was pointed out by the member fo
(Hong Kong) that the time now re
was very short but he would ask Mr
complete a draft of his synopsis by
if possible. The Secretary of the
meeting should correspond directly with
with regard to the arrangement of the s

The Stock and Area paper reque
the eastern Indo-Pacific area could be as
by individual countries concerned cont
sections describing the situation with r
their own industry. It was observe
in most countries there was no
studying sardines, and that generally
were caught in mixed fisheries. Sardine
was however believed to be in prog
Indonesia and the Philippines. It was su
that the Secretary of the Sardine meetin
contact workers there, and also Dr. R.
at Mandapam, who was working on the ta
and general biology of this group in the

The 9th Session of the Council
consider the inclusion of sardine stu
the agenda of Technical Committee I
is hoped the Report of the sardine
would be available as a methodologica

ESCO

e Council examined WP 13, Projects posals relating to the IPFC Region and ible to express an opinion on the projects as the supporting documents were not available. The Council directed the Secretariat to keep Member Governments apprised of developments.

APPENDIX

Record of exchanges made by Technical Committee I in the inter-session period since the Seventh Session

INTRODUCTION

n the period since the Seventh Session Council, the Committee work as such n effected exclusively by correspondence. chnical Secretary prepared circular letters ed to all members of the Committee to with matters that have been brought he Committee; ... report action taken O and ... note on current research s in other areas, relation to subjects est to the Committee; ..." The first of tters was dispatched in August, 1957. nately many copies of this letter seem gone astray. Many Committee members sked for a reply stated that they had eived the letter. The second circular as dispatched in June 1958. In addition regoing, the Chairman of the Committee t a general request for reports on work the various fields, and Chairman of and Sub-Committees have made similar . The material which follows is a tion of these several originating letters he replies received.

1. METHODOLOGY

General

957: "...The Council decided to request the FAO Fisheries Division to prepare a broad detailed categorization of methods together with a description of methods considered suitable for adoption by member countries, for the consideration of Technical Committee I during the period between the 7th and 8th Sessions of the Council."

a schedule of methods for which it was d that descriptions should be prepared stributed to and considered by the tee. This schedule is given as Appendix I. Whilst in general Committee members stated their views that the list was comprehensive, the opinion was expressed that an effort should be made to formulate the principles that should guide determination of the methods to be used.

The Committee was informed of progress being made by the Biology Branch of FAO Fisheries Division in the preparation of manuals; obviously these have a close bearing on this problem. Draft of the "Manual on Field Methods in Fisheries Biology" will be available at the current Session of the Council. This will be available only in sufficient number to provide one copy per delegation, it being expected that each delegation will nominate an individual to act as member of the Editorial Panel to comment on this draft. It is hoped that these comments can be received within a couple of months and that the Manual could go for printing before the middle of 1959. It is hoped that the Manual will be published in loose-leaf form and in a format that will make it durable for the field circumstances under which it would be used. The "Manual on Laboratory Methods in Fisheries Biology" is nearly complete and draft of it will be sent to the Editorial Panel during January or February. A draft of the "Manual on Fisheries Science" will follow shortly after. A "Manual on Sampling in Fisheries Biology" and the manual "Methods in Research in Population Dynamics" are under preparation.

Age determination of fish

1957: "...recommend the use of age-determination techniques wherever possible, in population analysis research because these were relatively inexpensive."

The Committee was informed that Biology Branch, FAO, contemplated preparation of a general review of this question.

(Japan) Studies on the annual marks of the calcified tissues of fishes including scales, otoliths and vertebral segments were carried out at the Governmental Fisheries Research Laboratories. Research workers of universities also examined scale rings of the tunas (bluefin, yellowfin, bigeye, and albacore), salmon (chum, red, and pink), and yellowtail. Extensive researches have been conducted mainly by the staffs of the Fisheries Research Laboratories to determine age of the sardine, herring, anchovy, salmon and saury. In the aim of determining age of the yellow sea bream, a few workers developed mathematical analyses of the length composition. (Dr. Kuronuma) Researches from new angles will be required in addition to the contemporary or orthodox methods.

(Malaya) Your proposal to prepare a review of the methods of age determination is timely and much appreciated. I have no paper for submission on this subject.

(U.S.A.) We have not advanced our thinking in this respect since the last meeting, and therefore will not submit a paper. We do have considerably more information particularly on the success of aging through tagging and are prepared to participate in discussions in this area.

(U.K., Singapore) No work on age determination has been carried out but data on the weight/length relationship in many types of locally caught fish have been collected. On this subject the Ex. Co. of IPFC at the last meeting at Saigon in May 1958 recommended that this subject might be referred to UNESCO to explore the possibility of granting a Fellowship to a qualified fishery worker to work at suitable centers on this problem, in order to ensure some advance in the knowledge on this subject.

(U.S.A.) We have engaged in intensive efforts to age tunas by using hard parts, such as scales, otoliths and vertebrae. Our tentative conclusion is that the method is not reliable, and the results cannot be legitimately used for determining growth rates and certainly cannot be used in erecting population dynamics equations. We have been successful in taining the growth rate of albacore and sk by means of tags, and reports will be pr within the next year on these results. not concur that age determination tech should be used for population analy tropical waters simply because they ar tively inexpensive. Poor or inconclusive are never inexpensive despite thei accumulation. Recent developments type of tags at Pacific Oceanic Fishery gations, in particular the dart or harpo which we used too successfully on suggest that population problems in waters can be most effectively solved by programs, Such programs may seem exp but in the final analysis they will mos be least expensive.

(Australia) In addition to stud flathead, flounder, barracouta and mulle otoliths and scales, a comparison is bein of baleen, overies and ear-plugs for deter the age of whales. Age determination in an Australian tropical fish *Lates ca* which occurs elsewhere in the Indo reveals that two 'breaks' or annuli are on the scales each year. These corres two crises in the fish's year when fee difficult, namely the flooding of rivers onset of the wet season, and the reten the fish in pools and waterholes on th plains or in the beds of the rivers whic to flow in the dry season. This indic need to take care in interpreting the of the scales of fish, particularly in regions. This study should be publishe

Standardization of plankton nets

1957: "... In order to facilita adoption of a standard zoop net, the Council instruc Secretariat to explore wa means of securing fund UNESCO or some other to purchase sufficient su (say 100) for distribut member countries in such n as may be necessary, understanding that membe tries "receiving them woul the results of their use to or subsequent session.

The Council decided to review the desirability of adopting a standard phytoplankton net, in the light of reports on the use of the tentative standard zooplankton net."

The Committee was informed that NESCO has agreed to provide a small mber of these nets. An order is being aced for them and the Secretary of the uncil has been asked to inform NESCO of the addresses to which these ould be sent.

Pakistan) No work has yet been done standardization of plankton nets in ntry.

Japan) An example of the studies so lable for the inter-session period was pt at comparing efficiency of two kinds ton net with the same mouth opening erent in length, one being NORPAC l other, Marutoku type. The investi- as carried out by the Tokai Regional ry during August and September 1958 ay of the IGY Oceanographic Observa- the northwestern Pacific Ocean, west V, north of 30°N. (Dr. Kuronuma) The may wish the Rastrelliger Center to the methodology in the adoption of ized net, and the member countries to experiment the net to report their the Council through the Secretariat.

Malaya) Standardization is welcome.

Singapore) No work on standardization ton nets has been carried out and it is d to await the holding of the Rastrelliger at Bangkok after which it is hoped rutoku-B type net would be made for some preliminary work. The Ex. FC decided in May 1958 that Mr. Tubb ask UNESCO to purchase the nets h and keep them at Bangkok for distribu- r the Rastrelliger Seminar.

U.S.A.) We have not followed the ndations of the Committee for adopting arutoku-B" type plankton net, except e have engaged in cooperative research s. In these instances we continue to l-meter net as a standard, supplementing s with "Marutoku" type net. Basically ct to using the small net for routine sampling in the central Pacific because it does not catch enough material for adequate quantitative comparisons. This problem is particularly distressing when attempts are made to assess the abundance of fish larvae quantitatively.

(Australia) Clarke-Bumpus nets are used for zoo-plankton and investigations are being made of their sampling error. Centrifugation of water samples is used for quantitative phytoplankton and nets and Hardy-type indicators are used for qualitative work. The efficacy of the centrifuging technique is now being studied. For the time being this Division intends to continue using the Clarke-Bumpus plankton net, which has been found satisfactory for our purposes. I hope we shall be kept fully informed on this matter.

Taxonomy

1957: "...The Council would, therefore, urge member countries to publish check lists of fishes giving the scientific names as well as the equivalent local and common names and to revise those already in existence, bearing in mind the needs of the fisheries biologist".

The Committee was informed that Biology Branch, FAO, would prepare for the Committee an account of the Branch's work on scientific and common names, together with a statement on the name lists in the possession of the Branch and a bibliography of Indo-Pacific check-lists. This work has not yet been done.

(Malaya) The proposed work is timely. If Mr. Rosa will indicate the type of information required, I would be glad to provide lists from the Federation of Malaya.

(Dr. Kuronuma) Mr. Rosa's catalogue will be most anxiously awaited.

(Singapore) A check list of local fishes giving the scientific names as well as the local equivalent is being prepared.

(U.S.A.) A handbook of the fishes of Hawaii by Dr. W.A. Gosline and V.E. Brock is completed and should be published by the fall of 1958.

(Australia) A Check-List of the Fishes of New Guinea has heen written and is now being published. A Handbook of Australian Fishes

is in preparation, about one-third having been published. A Handbook of New Guinea Fishes is in preparation and will be finished in 1959.

(Indonesia) A list of common commercial fishes of Indonesia has been prepared for the 8th IPFC meeting.

Population dynamics

1957: "... The Council felt that, whilst studies on population dynamics had hitherto been carried out only in the fields of sea fisheries and lake fisheries, the time was ripe for the extension of such studies to fish populations under cultural conditions".

The Committee was supplied with an interim report of the work of the Lisbon meeting and copy of a paper from the biologists of the Lisbon meeting to the technologists at the FAO International Fishing Gear Congress. The Committee may be interested in the proposal for the establishment of an International Journal of Fishery Dynamics, details of which will be furnished by the Technical Secretary at the meeting.

(Japan) Staffs of the Regional Fisheries Research Laboratories have laid their efforts on the population study of the important marine fishes. The species dealt with includes the herring, sardine, anchovy, salmon (chum, red, and pink), saury, tunas (bluefin, yellowfin, bigeye, and albacore), skipjack, mackerels, croakers, yellow sea bream, cod, Alaska pollack, flat fishes, and common squid. Age and length compositions of the commercial catch have been estimated for these species. The mortality rates, growth rate, and other parameters of the exploited fish stocks were also estimated for abundant fishes such as sardine in coastal waters as well as bottom species in the East China Sea. For marine fisheries amounts of fishing effort in number of trips have been annually published by the Statistics and Survey Division, Ministry of Agriculture and Forestry. Through the surveys conducted by Regional Laboratories, more detailed information of the efforts have been collected for some of the important fisheries. As to the sardine, results of the egg census have been reported every year from the Tokai Regional Laboratory. (Dr. Kuronuma) The summary report of the Lisbon meeting (FAO/57/7/4054 and 5132) listed technical numbering 93 submitted to the meeting. be highly appreciated if these papers or di of the paper were circulated to the r countries of the Council.

(Singapore) No work on this subj been carried out. It is hoped that work c initiated in the near future.

(U.S.A.) The Council recommend studies on population dynamics be exte fish populations under cultural condition Pacific Oceanic Fishery Investigations is tly studying the problem of optimum s rates of adult *Tilapia mossambica* for ma production of fry. Under the scheme en at POFI fry will be removed from th spawning ponds as soon as they are no cared for by the adult. Thus only one *Tilapia* culture is involved in thes experiments.

(Australia) This is a fundamental running through many of the investigati a special officer is now being sought ordinate and extend our activities. T work in progress during the year has H analysis of work done during 1954-57 i Macquarie, a marine dominated coastal New South Wales. No fish culture, oth hatching, is carried on in Australia; work is being done in New Guinea, but of population dynamics have not ye attempted.

2. PLANNING AND PROSECUTIO OF RESEARCH

Inland

The Committee was informed that by Mr. E.D. Le Cren on the application of to inland fisheries, which had been p under contract to the FAO International Fisheries Meeting at Helsinki in 195 being printed and would appear as Fisheries Study No. 8. This paper is available for distribution but a copy of it available at the meeting for examination Committee.

Fish culture in general

1957: "... Member Government urged to apprise the Cou further studies carried out subject."

ne paper on the use of impounded aters which is being prepared by ology Branch, FAO, is still in prepara- on.

Thailand) The common carp is gaining y as a pond fish in Northern Thailand. *iossambica* retains its popularity in N.E. l. *Pangasius* has received the attention armers in the Central Plain. Raising *atrachus* in ponds for Bangkok markets ising. Fingerling and young *Clarias* provided by the fish agents and the n Fisheries Station to pond owners in . The fish are sold after 6-7 months. ivation of *Chanos* is progressing slowly nt of the non-availability of funds for struction. In 1956, after the completion hao Phya Dam across the Chao Phya Chainat, small carps known as pla-soi, by bigger fishes, assembled at the eam side of the Dam. This led to a to study the effect of the Dam on fish a result a fisheries unit was established o have the task of studying the fish and of the Chao Phya River. Searching for ingerling grounds of *Pangasius* and other rps and *Chanos* is still carried on by the ent of Fisheries. A preliminary test use of pituitary gland to hasten the of gonads of *Pangasius* was made at g Borapet Fisheries Station in August he work will continue in 1959. A for the hatching of eggs of giant has been developed since 1957. It was ed to be an improved one. The fry was 86.6 out of 100 eggs hatched. *bus hoeveni* known as Pla Hang Daeng, nd to possess strong pharyngeal teeth similar to those of Chinese grass carp. the Bung Borapet Fisheries Station d that the fish of 6 inches in length tart eating submerged plants. A plan the fish in the irrigation tanks in N.E. l was approved. The work will start

Malaya) During the last year the on of Malay has been concentrating stocking of disused mining pools and with *Puntius javanicus* and *Tilapia ica*. These pools invariably carry stocks tory fishes such as *Ophiocephalus* and The 'modus operandi' is to clear ols first with Shell 'Endrex' a most potent insecticide and piscicide. A concentration of 0.008 p.p.m. of 'Endrex' has been found to be convenient for the purpose and mining pools of up to 20 ft. in depth have been treated successfully. Shell 'Endrex' has also been successfully used for harvesting Chinese carp from mining pools, some up to five acres in extent and 30 ft. deep, where operations with a seine net would well-nigh be impossible. Shell 'Endrex' is much cheaper to use than 'Derris', and in shallow ponds, of 3 to 4 ft., the pond was fit to receive fish again after 10-14 days. This is also the normal period allowed for when a pond has been poisoned with 'Derris'. The stocking of these mining pools with *Tilapia* and *Puntius javanicus* have been much appreciated by the local population, and in some of the mining villages *Tilapia* are appearing in the village markets.

(Dr. Kuronuma) Dr. Job's paper on the use of impounded waters is awaited. Japanese National Congress for Inland Fisheries studies will hold the 1958 Annual Meeting in October, when the works carried out during the inter-meeting period will be discussed on the basis of the resolution attained in 1957 meeting. If time permits I shall summarize the discussion of the meeting and report to the Council Session. Starting from March 1958 the fisheries survey has been conducted on the Lake Akiba, an impounded water of main-flow type on the River Tenryu, Honshyu, Japan. The survey has been carried out since 1954 on the three impounded waters established on the same river in the order of Hiraoka, Sakuma and Akiba, and the survey on the Lake Akiba, the lowest in river, will conclude our 5 years' study on the fisheries survey on those three reservoirs. The survey covers the subjects of limnology (temperature, oxygen, carbon dioxide, pH, turbidity, transparency, level fluctuation, bottom material etc.), biology (plankton and benthos) and fish (species, size composition, food habit, spawning etc. based on the materials experimentally fished by gill-net, trap, long-line and angling). The other fisheries work carried out on the Lake Sagami, also an impounded water, will complete in October 1958 the experimental gill-netting of two years period. In this experimental fishing the four sets of net each with different mesh size were operated monthly at nine selected stations in the lake. The catches of fish obtained in this experiment will be analyzed into species combination,

mesh selection of species and fish size, local and seasonal change of the catch, catch per unit effort, food habit, etc.

(France) Il est un problème qui mériterait, je crois une certaine attention, c'est celui de la création de races sélectionnées des espèces utilisées en pisciculture. Sauf pour la Carpe commune, je ne sache pas que rien ait été fait à ce sujet pour les diverses espèces d'eau chaude. C'est certainement possible pour un grand nombre d'entre elles, sauf, naturellement pour celles dont la reproduction ne s'effectue pas en eaux closes (Carpes chinoises et indiennes). La sélection constitue un moyen d'augmenter les rendements qui a l'avantage sur d'autres, tels que la fertilisation des étangs ou le nourrissage artificiel, de ne pas exiger du pisciculteur, un surcroit de travail et de dépenses. Nous avons commencé en Afrique un travail de sélection sur certaines espèces de Tilapia *(T. melanopleura, T. nilotica)* dont les premiers résultats ne peuvent pas encore être publiés, mais qui semblent devoir être intéressants.

(U.S.A.) The current session of the United States Congress has passed a Bill (Public Law 85-342) authorizing and directing the establishment of research and experimentation on the rearing of fish in rice fields. The essentials of this law are as follows :

'1. To determine species of fishes most suitable for culture on a commercial basis in shallow reservoirs and flooded rice lands;

2. To determine methods for production of fingerling fishes for stocking in commercial reservoirs;

3. To develop methods for the control of parasites and diseases of brood fishes and of fingerlings prior to stocking;

4. To develop economical methods for raising the more desirable species of fishes to a marketable size;

5. To determine, in cooperation with the Department of Agriculture the effects of fish-rice rotations, including crops other than rice commonly grown on rice farms, upon both the fish and other crops; and

6. To develop suitable metho harvesting the fish crop and pr it for marketing, including of sport fishing as a means harvest.'

At the present time the U.S. F Wildlife Service is formulating a prog meet these objectives. Preliminary stud be conducted during FY 1959, and it is that a fully active program will be well way during FY 1960.

(Australia) The results of experi work on stocking of farm dams and stu the biology of tench are being published

Nutrition of fish under cultivation

1957: "...The Council suggeste FAO could help to stimula on this subject by prepa comprehensive review. Council urged Member ments to report progress subject in the Current Bulletin."

The general paper on this requested by the Council has n begun but Biology Branch, FAO, to be able to prepare this in th inter-session period.

(Malaya) Dr. G.R. Fish, of th Culture Research Station, Malacca, h working on this problem and will have for presentation at the Eighth Session.

(U.S.A.) We are at present eng experiments concerning nutrition of under intense cultivation. The results far enough advanced to form the bas contributed paper. However, we will be p to participate in any discussions th pertinent.

(Dr. Kuronuma) The present carried a variety of problems as I have re expressed elsewhere, and still wish to among us the classification of the subjects involved in this broad categ small piece of work carried out in my La may be helpful to fish nutritionists wh to know exactly how much nutritious su (for instance N) which was fed to th actually eaten and digested. We have

amount of Cr_2O_3 to the fish food which to the fish under experiment; the material of the fish was carefully and the amount of Cr_2O_3 as well as is substance contained in the faeces mined. Knowing that Cr_2O_3 is not by fish and also that the ratio of the l and nutritious substance in food and ve could determine how much nutritious e was absorbed by the digestive organ sh.

France) Des travaux ont été faits en sur l'alimentation artificielle des Tilapia culture. Ils ont fait l'objet d'un certain de communications au Symposium tenu aville en juillet 1956. Mr. Dill, qui à ce Symposium, doit les avoir en sa on. Il me paraitrait particulierement t d'examiner la capacité d'une espéce utiliser une alimentation artificielle en de la nourriture naturelle dont elle dans l'étang.

U.S.A.) The Pacific Oceanic Fishery iations is currently testing several diets *pia* in order to ascertain the optimum n the point of view of cost and produc- adult *Tilapia* being held as brood stock production. Results of this program be available for at least six months.

India) See Appendix II.

oil composition in fish ponds

957: "... The Council recommended that more data should be assembled regarding the various techniques involved in sampling and examining bottom deposits, and that a clear and simple interpretation of the results of such surveys should be reported."

A paper by Dr. A.G. Wurtz, of araclet, France, will be available this eeting.

Thailand) No study yet.

India) A research unit has been estab- under the Second Five-Year Plan of the Central Inland Fisheries h Station to carry out investigations omposition in relation to fish production ponds. The work is at present mainly l to a number of fish farms in different areas of soil structure in Orissa State. Determination of soil reaction and available micro-nutrient status of the soil in 48 tanks managed by the State Fisheries Department and in 24 fish farms distributed all over the 13 districts of the State showed that mostly the soils are either slightly alkaline (pH 7.0-8.0) or slightly acidic (pH 6.0-7.0). In same areas, viz., Keonjhar, Dhenkanal, Angul, Berhampur, Belgunta and Bolangir tank, soils showed relatively more alkaline reaction (pH 7.8-8.2) while Naupara (Puri) soil pH was less than 6.0. Available phosphorus was rather poor in all the areas except Athmallik, Berhampur, Sambalpur and Naupara and available nitrogen fluctuated irregularly bearing no correlation with available phosphorus.

A series of manuring experiments conducted in 24 ponds at the Linghipur fish farm showed that the soil, though slightly acidic (pH 6.3-6.6), does not appear to respond to liming at doses 200 lb./acre and 600 lb./acre. Observations after one month of adding the lime showed that there was practically no increase in soil pH, all the soils remaining slightly acidic as before. This evidently showed that the reserve soil acidity was considerably high, even a dose of 600 lb./acre of lime being unable to make the soil reaction slightly alkaline. It was also noted that even a heavy liming was not able to increase the soluble inorganic phosphate of the water by releasing the absorbed phosphate of the soil. This may however be accounted for by the fact that the available soil phosphate itself is very low.

Just after liming some increase in soluble alkalinity was observed as compared to that in control ponds, both for low liming and heavy liming. A marked increase in alkalinity to about 300 ppm. was observed in ponds treated with high lime and high organic manure, but this increase was only temporary. At the end of September the total alkalinity in all the ponds came down to about 60-70 ppm. Addition of phosphatic fertilizers at high dose (600 lb./acre) of organic manures (cowdung 30,000 lb./acre) increased the soil phosphate appreciably. It is interesting to note that lime played an important role in increasing the available soil phosphate. Thus the increase of available soil phosphate for combinations (1) high lime and high phosphate and (2) high lime and low phosphate, was greater than that for low lime and high phosphate.

To study the growth rate of the major carps Rohu, Catla and Mrigal under different soil conditions, 12 selected tanks in the State of Orissa and six tanks in Madhya Pradesh have been stocked with carp fingerlings Rohu, Catla, Mrigal in the ratio 1 : 1 : 1 as far as practicable. The Orissa tanks have been stocked at the rate of 2000 fingerlings per acre. Observations made so far on soil quality show that both in Orissa and in Madhya Pradesh soil reaction is generally either slightly acidic or slightly alkaline. The available phosphorus is rather poor in piscicultural soils of Orissa while for Madhya Pradesh soils, phosphorus status is quite fair. Available soil nitrogen is quite appreciable both in Orissa and in Madhya Pradesh.

(Malaya) Dr. Wurtz's report will be welcome.

(Dr. Kuronuma) Dr. Wurz's treatise is waited. Our study on this subject is still in the preparatory stage to familiarize the many factors involved and prepare experimental facilities as well as qualified workers.

Problems arising from the introduction of non-indigenous fishes

1957: " ... Member Governments in possession of information on possible control measures in respect of less desirable fish species were urged to apprise the Council of such information.

(Thailand) Non-indigenous fish species introduced are Chinese carps and *Tilapia mossambica*. *Tilapia mossambica* had been reported in 1958, as being harmful to rice seedlings in the coastal area of Chantaburi Province, when the fish ponds were flooded and some fish escaped into the rice nursery areas.

(U.S.A.) In response to your letter of 25 September, I have assembled the following brief list of references pertinent to the control of fish species.

Applegate, V.C., J.H. Howell, A.E. Hall, Jr. and M.A. Smith, 1957. Toxicity of 4,346 chemicals to larval lampreys and fishes. U.S. Fish and Wildlife Service, Spec. Sci. Report-fish. No. 207, March 1957.

Ball, R.C., 1945. A summary of e ments in Michigan lakes o elimination of fish populations rotenone, 1934-1942. Trans. Fish. Soc., Vol. 75 (1954), pp. 1 fig. 1.

Bridges, W.R., 1958. Sodium cya a fish poison. U.S. fish and W Service, Spec. Sci. Report-Fish 253, February 1958.

Greenbank, J., 1940. Selective poi of fish. Trans. Amer. Fish Vol. 70 (1940), pp. 80-86.

Krumholz, L.A., 1948. The use of ro in fisheries research, J. W Management, Vol. 12, No. 3, Jul pp. 305-317.

Shields, J.T., 1957. Experimental of carp reproduction through drawdowns in Fort Randall Re South Dakota. Trans. Amer Soc., Vol. 87 (1947), pp. 23-33.

Not listed in SSR No. 207 are two cals which show great promise for pr control of sea lamprey larvae; these a 6-trichloro-2-nitrophenol and 3-trifluorome 4-nitrophenol. By promise, I mean tha have passed the laboratory tests with colors and also passed field tests of a pilo scale with flying colors. The chief fl course, in physical or chemical cont undesirable species is that it is a p certainty that such control will have repeated indefinitely. This suggests th if methods are developed, they will practical except when applied in water intensive cultivation, or in the instances exceedingly valuable fisheries, such as th Lakes trout, are threatened with ext Obviously, permanent solutions must fal realm of biological control, an unexplor with respect to fishes, so far as I know.

(India) The Standing Fisheries R Committee constituted by the Governm India reviews periodically the problems introduction of non-indigenous spec fishes in India. The mirror carp *(C carpio*, brought into India some time b thriving well all over India. Generally tudes higher than 2000 ft. the Researc mittee has recommended its introduct all cultivable waters. *Tilapia mossambi*

led recently into India. In view of the carp culture is highly organized in rts of India, particularly in the Indo- Plain and in view of the possible effect, which indiscriminate introduc- *Tilapia* may have on carp culture, it ered by the Fisheries Research Com- hat *Tilapia* should not be introduced l basins but may be introduced only specified by the Committee where r carp culture is limited and from where may not by natural causes spread to ining areas and the Committee has ended that steps should be taken to e *Tilapia* from other areas outside those ed in which it may have been intro- ready, excepting in experimental cen- roved by the Union Ministry of Food riculture. The scientific work so far out does not justify the extension of s at present permitted for *Tilapia* cul- he future investigations by the Central s Research Stations and State Govern- ncerned will be with specific reference ffect of culture of *Tilapia* on the cul- arps, and culture of *Tilapia* as a forage pure strain of common carp *Cyprinus* was recently obtained from Bangkok periments are being conducted on this Cuttack Sub-Station of the Central Fisheries Research Station. This fish breeding at low elevations. Cultural ies suited to local conditions have been and experiments on the fish are in . Attempts are being made to get a ment of Chinese Grass Carp for weed experiments.

Malaya) The Federation of Malaya has period of years introduced a number of igenous fishes for cultivation. There ually no problems arising out of the tion. Our main problem has rather w to make the introduction more suc- in other words how to extend their in areas where they are needed. Of rinthine fishes, the most successful is e *Trichogaster pectoralis* and it is found abundantly in our swampy rice-fields west coast. They have not been able lish themselves on the east coast of because the rice-fields and swamps dry ing certain times of the year. *Tilapia ica* has met with varied success. Chinese eepers prefer to stick to Chinese carp but here again the problem of a regular supply of fry from China is one that will always remain, until science can point the way to induce the three species, viz. *Ctenophayrn-godon idellus, Aristichthys nobilis* and *Hypoph-thalmichthys molitrix* to spawn in this climate. *Catla catla* have been imported from India and cultivated in Chinese ponds under the same conditions as Chinese carp. They were found to compare favorably in growth-rate with Chinese carp and there is a growing demand for them from pond-owners. However, there is still a high mortality rate during transit by air from Calcutta. This, together with the high cost of air freight from Calcutta, would bar any likelihood of a regular trade, for some time to come. The Indonesian ikan mas or 'Si-nonya' has also been tried out here by the department. The strain has however been lost due to crossing with the local common carp. Another Indonesian import, viz. *Puntius javanicus* has been successfully bred in departmental ponds and some 20,000 fry have already been distributed. It is gaining rapidly in popularity among the Malay and Chinese pond-owners, because they accept grass cuttings and tapioca leaves readily. They attain a weight of 200-450 grams in one year and fetch a good price in the local market, as it is so much like one of our river fishes *Puntius schwanefeldii.* A supply of *Tilapia Melonopleura* sent through the kind offices of Mr. Boon of Thailand failed to survive predators *(Ophiocephalus and Clarias)* which obtained entrance into the pond.

(U.S.A.) Biological control of exotic species has received little serious attention. Chemical control has been investigated seriously only with respect to the sea lamprey, which invaded the Great Lakes. Exhaustive screening of chemicals has uncovered one or two compounds which appear to be specific to sea lamprey larvae. Further, it appears that it will be economically feasible to eradicate the sea lamprey with these chemicals. So far as I know, there have not been any other overt attempts to locate control chemicals. However, research on the use of copper sulfate and sodium arsenate in connection with other studies suggests that various species of fish have different tolerance levels and that chemical control might be a practical approach. Manipulation of the environment by lowering the water levels of reservoirs at critical times seems to offer some promise for carp control. The

technique is to ascertain the time of spawning and then draw down the reservoir a few feet, stranding and killing the eggs. Biological controls such as introducing suitable parasites or predators have not been investigated, so far as I know. Additional techniques showing some promise in insect control, that is releasing in the wild, large numbers of the undesirable animals that have been sterilized through radiation in order that mating will be unsuccessful, have not been considered with respect to fishes, so far as I know. There probably are other approaches and many of them might be quite successful, at least judging by the sometimes spectacular results achieved by entomologists.

(Japan) The Japanese Government is not in a position to give any information regarding this subject, because no steps have been taken so far in Japan to control the introduction of the exotic species of fish. (Dr. Kuronuma) In the country we have witnessed the natural spawning of Chinese carps (grass—carp and silver—carp) during the past several years. In 1957 the fish fry of these two species were obtained under artificial aids amounting to 20,000. In 1958, due to unusual drought, we have failed in the work and were able to obtain fry numbering only 2,000. The record of our experience in these two years will be partly reported to the Council Session.

(U.S.A.) In the U.S. and Hawaii legal control of the introduction of exotic species rests with the States and Territory. In the instance of Hawaii, no species of plant or animal may be imported without specific permission from the Territorial government. Many states, California for example, go beyond this and have blanket legislation prohibiting the transportation within the state of live fishes for stocking and prohibiting such stocking unless permission is given by the responsible officials. Despite this legal basis, it is virtually impossible to prevent the movement of fishes within state boundaries, primarily because of the enforcement problem. Control of importations from without the state or territory is somewhat easier, especially if commercial shipping firms must be involved as in the case of Hawaii, and because commercial access routes are frequently monitored by agricultural inspectors. If you analyze the situation from a practical point of view, it is obvious that fishes are not likely to be transported great distances by private parties for introduction to new areas. Logistic procedures are simply too complex. tends to give the administrator control of the situation with resp states, territories and large geographical Once, however, a species has been aut for a given geographical area, distr within the area is then out of the adm tor's control, for it is too easy for indi to move fish for short distances and it take a prodigious amount of law enfor to preclude the possibility. The admini must therefore count on complete di within his geographical area when he aut the importation of an exotic fish. there is the problem of the tropical fis which is worldwide and subject to li any, monitoring and regulation though basis for such action frequently exists trade in effect destroys any barriers that exist or be erected, though in temperate tries does not present a serious problem most species will not survive in the w conclusion, it might be possible to entry of fish species to countries, stat ritories or discrete geographical areas a system of inspection at access poin ternal control does not seem suscep regulation unless a costly specialized e ment apparatus is developed.

(Australia) The Commonwealth ment, through the Department of Healt cises control over the importation of l into Australia. The Commonwealth aut are concerned with the importation of d fish. All live fish are inspected by a tine officer of the Commonwealth Dep of Health and he must issue a landing before entry of the fish will be allowe various State Fisheries Authorities also the entry of certain fish into the re States. The State Authorities are in in ensuring that the indigenous fau protected from predatory fish, and any i fish belonging to a predatory species classed as a prohibited import. A biologist examines all consignments of i live fish to determine whether any spe predatory and may also be asked to give concerning fish diseases. The gener cedure is along the following lines: the examined by a fisheries biologist and a tine officer and a permit to land is gra withheld. The Customs officer at the

ised accordingly. If a permit to land is sued, then the Customs prohibition of nportation of that fish is automatic. It e said that the only type of fish imported Australia in the last 20 years for the ng of streams and lakes, has been trout New Zealand. Australia does, however, quite large numbers of aquarium fish he tropics, and a tight control is exer- over these consignments to prevent unde- species being introduced by private s, on the assumption that it would be le for aquarium fish to be released uently into streams if not wanted by wner. Before aquarium fish are released Commonwealth control after arrival, a Government Ichthyologist advises the Commonwealth Quarantine Officer con- g the species, and if appropriate, any e considered undesirable are removed.

-basin development

1957: "... The Council recommended that early surveys should be carried out on notice being given of impending construction of dams, and that dam sites should be cleared before water was allowed to accumulate in order to protect fish species already present, and to facilitate the early exploitation of the reservoir stocks"

The Committee was informed of a special meeting on integrated river development schemes which was being organized by the United Nations. Documentation of this meeting for distribution to the Committee has not yet been obtained. The Committee was also informed of the Symposium of the International Union for the Conservation of Nature and Natural Resources. Copies of one of the background papers of this meeting will be available during the Council Session and as soon as a report of the Symposium is prepared, copies will be sent to Committee members.

(Thailand) A Preliminary Report on the rvey of the Meping River will be ready blication in 1959. It is expected that port will furnish additional information Irrigation Department, which is the ty for the Hydro-electric development of the Meping River at Yanhee. The officials of the Department of Fisheries and the Irrigation Department were instructed to furnish the available information on fish behaviour to the fishery expert of FAO Mekong Development Mission.

(India) The problem of development of the river basins particularly the large number of vast multi-purpose reservoirs which are being constructed all over the country, is receiving considerable attention in India. A Lacustrine Unit established recently at the Central Inland Fisheries Research Station has carried out a rapid survey of the various reservoirs all over India and the Unit has now been posted at the Tungabhadra reservoir in Mysore State to carry out investigations directed towards development of the fisheries of such reservoirs. The Damodar Valley Corporation, which has four large reservoirs under its control, has undertaken to organize fisheries development in the reservoirs. Extensive stocking of one of the reservoirs with major carps is being carried out and experimental exploitation is also being conducted.

(Malaya) Copy of the report on IUCN Symposium in Athens is welcome.

(Japan: Dr. Kuronuma) See item on Fish culture in General. The report of the IUCN Symposium in Athens will be highly appreciated by us at the Council Session. I wish again to insist to bring the subject of the Lower Mekong River Basin Development to the discussion of the Council Session. In this respect the Council may wish to hear the present status of the problem from either Secretariat or Member Governments concerned with the development.

Water pollution

1957: "... The Council ... urged Member Governments to keep this problem constantly under review, and to ensure that action could be effectively taken before serious damage was caused."

The Committee was informed of participation by Biology Branch, FAO, in meetings convened by the Economic Commission for Europe, to discuss European water pollution problems. Copies of documents from those meetings were supplied to the Committee. A further meeting recently took place at which

proposals were made for the establishment of international river pollution control boards. Copy of these proposals will be sent to Committee members when available.

(Thailand) No study has been made on water pollution. It has been observed that the canals of the city of Bangkok are now deprived of *Pangasius* fry and fingerlings due to the polluted conditions of the canals.

(Japan) After World War II as a result of industrial development and expansion of city life, coastal fisheries have often been hampered by water pollution. In the Regional Fisheries Research Laboratories, Prefectural Experimental Stations and Universities, investigators estimated such factors as dispersion of sewage and industrial waste; influences of these materials upon aquatic organisms through tracing of stained water mass; culture experiments; observation of faunal change; chemical analyses of water and bottom mud. Based upon these physical, chemical and biological investigations, efforts have been laid on estimation of the loss in the commercial fisheries. (Dr. Kuronuma) Despite the fact that the problem of water pollution is not so serious in the greater part of the region at the present moment, I believe it is now a proper time for the Council to take a step to formulate a program on this subject keeping intimate contact especially with ECAFE and WHO. The cases of ill effect to the fish life of water pollution are indeed countless in my country though its magnitude differs from case to case. Under such circumstances I believe it very important for each member country to consider (1) to establish a solid national program (legislative) for the conservation of water quality before the progress of the industry, (2) localization of industrial development as a part of national policy, (3) encouragement of scientific research not only to abate the ill effect of pollution but to convert the waste products to our beneficial uses. In my Laboratory the data have been accumulated concerning the effect of agricultural insecticides to the fish and other aquatic organisms, and two papers will be submitted to the Council session as a contribution.

(India) The All-India Institute of Hygiene and Public Health has been carrying out extensive surveys of river pollution in different parts of the country. A Water Pollution Unit has been established at the Central Inland Fisheries Research Station recent this Unit is at present conducting stud the effects of factory effluents on the fisheries at Kamp one of the big industria in India. Seven main sampling station been established where samples of plankton, biota and fish fauna are being col

(Malaya) Water pollution as a of alluvial mining for tin is a problem rivers on the West Coast. In areas when pollution is heavy, there is a change fauna from the riverine carp to the catfis of fishes. A more serious pollutant discharge of effluents from latex factories, the effluents may contain acids or am This problem has not as yet assumed n importance.

Weed control

1957: "... The Council recomm that further information general subject of weed c in ponds should be co Interested Member Gover were urged to carry out experiments in order to ass amount of plant material con by the Chinese Grass Ca the relative suitability of t ferent common plants as" of food for this fish.

(India) A research unit for cond investigations on control of sub merged weeds has been established at the Central Fisheries Research Station. This unit h ried out a survey of such waters and is at conducting experiments with various che The details of experiments are given belo

Experiments in earthenware showed that *Salvinia*, *Pistia* and *Lemna* ar pletely killed by powerine and h.s.d. app the rate of 75—100 gls. per acre under co of bright sunshine, the killed plants dec ing and dissolving in water in about 3—5 In the case of *Salvinia* a lower concentra 50 gls. per acre was also effective. If, ho there is rain before the plants were com killed, there was a tendency for the pl revive. The effect of these oils on hyacinth was not so marked even whe treatments at 75—100 gls. per acre were within ten days. Though the leaves affected, the plants revived gradually

ffect of these oils on fish life is under

The principle of starving out the under- parts of water lily was applied in a pond acre choked with the plant. The floating were cut about 1—1½ ft. below the water during the first week of October. By bsequent clearances of 29%, 19%, 32% and in terms of the number of leaves present outset) of fresh leaves which came up, nd could be kept thoroughly clean in two s' time. Even though four months had after complete clearance, the plant has appeared, indicating thereby that the round parts have been completely killed. st of labour at 60 man hours for the 0.32 nd worked out at about Rs. 45/—per acre.

Hydrilla and *Naias* grown in cement s were treated with nigrosine at the rates and 250 lbs. per acre. Though the water se cisterns remained black for 3—3½ s, there was only a slight arrest in the of the plants from the second to the month after treatment, compared to is growth of the same plants in an ted cistern. When the water cleared in ated cisterns at the end of 3½ months, the started growing vigorously again, thereby ig that nigrosine is not a very effective g agent. Preliminary trials in aquaria sterns with fernoxone, Dicotox, 2,4—D at s doses did not yield encouraging results.

Experiments conducted at Calcutta pre- had indicated that superphosphate at 00 ppm. (single application or in instal- t close intervals) killed submerged weeds *ydrilla* and *Vallisneria* almost completely. affected plant which remained was cleared lly. The experiment was repeated at k on *Hydrilla* and *Naias* grown in cement is. Within a few days after treatment a of algae appeared in the treated cisterns —95% of the plants were killed within months. Thereafter the algae bloom eared and the surviving *Hydrilla* multiplied from underground parts, while Naias did ppear.

Much the same result was obtained when rcial urea was applied on *Hydrilla* and grown in cement cisterns at the rates of 00 ppm. (in one instalment) and 300 ppm. instalments. However the algal bloom which appeared was thicker and the destruction of plants more complete than in the case of superphosphate. Small shoots started coming up in the cisterns treated with 250 and 300 ppm. only at the end of 3½ months, when the water cleared. In the cistern treated with 500 ppm. no shoots appeared even after 4½ months, though some underground parts of *Hydrilla* still remained in the mud.

With lower concentration (50-125 ppm.) of the fertilizer 50-90% control of *Hydrilla* was obtained under the same conditions and in a field experiment conducted in a pond choked with *Hydrilla* and *Naias* 50 ppm. of the fertilizer killed 50-60% of the submerged weeds. In the pond there was partial mortality of fish two days after treatment owing to the depletion of oxygen in the early morning hours. Some of the distressed fish caught and released in freshwater revived quickly.

Preliminary experiments in earthenware gumlas indicate that ammonium sulphate at 100 ppm. is useful in cleaning *Hydrilla ceratophyllum* and *Pistia* and a large percentage of *Vallisneria* and *Lemna*. Further experiments in different concentrations have to be carried out before drawing definite conclusions.

Comparative estimates of cost of clearing weeds by manual labor and by chemical treatment (sodium arsenite) revealed that in manual labour 720 man-hours each at a cost of Rs. 180/- per acre had to be put in, which works out to Rs. 240/- per acre per annum, whereas in chemical treatment one application every six months at a cost of about Rs. 40/- which works out to Rs. 80/- per acre per annum was sufficient, the cost per acre foot for one application being Rs. 13/- to Rs. 15/-.

(U.S.A.) Under the sponsorship of the Territory of Hawaii, Division of Fish and Game, *Tilapia mossambica* has been introduced into irrigation reservoirs for weed control with generally good success. The problem of weed control in irrigation ditches is somewhat more complicated. The results to date suggest that *Tilapia mossambica* has been an effective means of controlling submerged aquatic vegetation in reservoirs where the vegetation was fairly soft bodied such as *Potamogeton* or *Anacharis*. Experimental work is currently under way utilizing two other species of tilapia which, at least under laboratory conditions, will eat much

coarser vegetation. These two species are *Tilapia zilli* and *T. melanopleura*. The results to date suggest the possibility of maintaining impoundments relatively free of aquatic growth, providing the impoundments do not contain predatory fishes which will serve to seriously reduce the abundance of tilapia species. However, the experimental work with species other than *T. mossambica* has been under way for such a short time that nothing can be said of a conclusive nature about the usefulness of these other species for this purpose. The control of aquatic vegetation in irrigation canals and ditches is a more complicated problem since the tilapia species are essentially pond fish and will not remain in rapidly flowing ditches in sufficient concentrations to have any real effect on the aquatic vegetation. The use of loricariid catfishes and/or algae-feeding freshwater gobies has been suggested where such vegetation is soft bodied such as various species of algae. No satisfactory fish has been suggested where the vegetation is more robust. In certain ditches, notably those with earthen sides and bottom, and where the current is reasonably swift, the coarser vegetation does constitute a major problem. Often the use of chemical control methods is prevented by the fact that the water in the ditch is not only used for purposes of irrigation but also for domestic purposes as well.

General inland fisheries

1957: "... The Council recommends that in such areas, the stocking of natural swamps and waters with a handy species such as *Puntius javanicus* may be a preliminary step towards developing freshwater fisheries."

(Australia) Advice is given to inland bodies (e.g. Snowy Mountain Hydro-Electric Authority) but no experimental programs are in progress.

Brackish waters and Dromic Species

Chanos

1957: "... It recommended that the Sub-Committee ... should collect the necessary information on any techniques used in member countries which reduce this mortality and make an appropriate report at the next Session of Council."

Mr. W.H. Schuster has prepa synopsis of information available on this s The synopsis will be available as one papers for this Session of the Council.

(Malaya) There is no culture of in Malaya. Neither has fry been found coasts.

(Japan: Dr. Kuronuma) I would suggest exploring a way through whic information on *Chanos* fisheries will be av from Taiwan. It is expected that the Vietn Government will report her successful c of *Chanos* fry in her sea water during the months of 1958, and we hear that the G ment will continue her efforts to collect and further to advocate pond-culture fish particularly in the delta region of the Mekong.

(Dr. Fish, Chanos Sub-Committee) stantial progress, resulting in techniques reduce *Chanos* fry mortality from over less than 10% during the initial stages of c was reported in the Proceedings of t Session. Much of this progress is due t done in the Philippines. The results of ments on the provision of adequate food fry showed how the natural algal food in nursery ponds could be encourag develop greatly by the application of c and inorganic fertilizers, and that, if re this natural food could be successfully s mented with certain protein-rich additiv was also reported from Indonesia that a tion in the existing fry mortality rates o 80% in the early stages could be obtain modifying the design of nursery ponds careful eradication of predators. Few of such research during the inter-se period has been received. In many cou e.g. Papua, New Guinea, Ceylon, Malaya is very little or no culture of Chanos pr although it is likely that fry may be found certain of these shores. Much intere been shown by several authorities, howe *Chanos* culture and it seems probable tha data on this problem will be available course.

(India) The problem of reducin mortality of *Chanos* fry in nurseries ha receiving general consideration in cent India where milkfish culture is being a carried out. Experiments on the fol

es of approach were conducted at the Marine Fisheries Research Station.

Natural mortality has been found to great in the early fry of 13-20 mm. .e. where the post-larval transformation iplete). This becomes higher still as ose much of their resistance in spite of iandling during the different stages of n, transport and ultimate transfer to a it different environment.

tality due to change in environmental Preliminary studies on the physiology ry (Job, 1957) and also unpublished ions based on work in progress) indicate fry of *Chanos* do require a relatively environment than the open sea in order ain the intensity of their metabolic Incidentally, this also seems to be one contributing factors for directing the nts of the fry towards the shallower eks.

aspecific and Interspecific predation. al introduction of predator larvae, such of *Elops* and *Therapon*, which invariably ong with *Chanos* fry, is possible in all ial stocking operations. The extent to nese predator larvae can take a toll of is illustrated by the experimental ion that a *Therapon* (about 20 mm. long) s a maximum of 13 *Chanos* fry over a f 24 hours. The same is true of the halus' larvae of *Elops* which prey upon y of nearly their own size and, at the e, are hard to eliminate because of their ansparent body.

periments have also revealed that when y of different sizes are stocked together, r ones chase and kill the smaller fry in the ultimate survival of mostly the oup.

ne studies so far have not been quite ve as to offer any specific solution to rtant problem of reducing the mortality. less, they indicate the following es- ines on which further work will be

(i) More efficient removal of predators prior to the introduction of fry into nursery ponds.

i) Segregation of the fry in nurseries according to different size groups.

(iii) Preventing abrupt changes in ecological characteristics, particularly the temperature. A better understanding of the physiology of the fry, particularly their metabolic requirements, reaction towards salinity and temperature gradient, is essential.

(iv) An immediate and more practical method adopted in some of the marine and brackish water fish farms of India is by utilizing mostly fingerlings for stocking the ponds and thereby circumventing some of the difficulties of nursery management. For collecting the fingerlings from shallow creeks and lagoons, besides the method described by Ranganathan and Ganapathy (1949, Indian Farming, 10 (9): 368-374) a local gear known as 'konda valai' (a long piece of cotton twine net, about 10 m. x 1 m. with spreader sticks at equal intervals) is used in conjunction with scare lines at either end. When the net is dragged along the bottom of the creek the fish are lured into the net from where they are transformed into suitable containers by means of small hand nets. For transporting the fingerlings the standard type of containers require an additional supply of oxygen. Therefore, a tow-box with velon netting on four sides and the top has been devised at this research station by Dr. S.V. Job and successfully used for live fish transport. The fingerlings are transferred into the tow-box at the collection center itself and towed in the water to the stocking place.

This practice, while applicable only for places where sufficient numbers of fingerlings can be collected and where means of water transport are available offers practical advantages in (a) minimizing time and expenses involved in the elaborate preparation and management of nurseries, and (b) in ensuring a greater percentage of survival from the fingerling stage onwards when they seem better capable of adjustment to pond conditions as well as in dodging predators.

Other publications on *Chanos* not reported earlier:

Chandy, M. (1956) On the oesophagus of the milkfish *Chanos chanos*. (Forskal) J. Zool. Soc. India, 8 (1): 79-84.

Chacko, P.I. and S. Mahadevan (1956) Collection and culture of the milkfish *Chanos chanos* (Forskal) in and around Krusadai and Rameswaram Island. Fish. Sta. Report and Yearbook, April 1954-March 1955, Govt. Press, Madras; 145-154.

Job, S.V. (1957) The routine active oxygen consumption of the milkfish. Proc. Indian Acad. Sci., 45:254-273.

Tampi, P.R.S. (1957) Some observations on the reproduction of the milkfish *Chanos chanos* (Forskal). *Ibid* 46:254-273.

--- (1958) On the food of *Chanos chanos* (Forskal). Indian J. Fish. 5:107-117.

Mugil

1957: "... In view of the lack of knowledge relating to the spawning and early stages of development in certain species of mullet, it recommends that particular attention be directed towards the prosecution of such research in member countries."

The synopsis awaited from Mr. Bromhall is not yet available.

(Malaya) Mr. Bromhall's report will be welcome.

(Japan: Dr. Kuronuma) Mr. Bromhall's report has been awaited for the past two intersession periods.

Hilsa

1957: "... The desirability for active workers in this field to be given the opportunity to meet to exchange news and discuss the standardization of experimental methods was stressed."

The Technical Assistance project on *Hilsa* in Pakistan was completed in 1958. Copies of the report will be made available to the Committee when the report is released.

(India) The investigations on *Hi* eries initiated in the National *Hilsa* R Unit, established at the Central Inland F Research Station at Calcutta, were co during the period. Observations were out in the rivers Hooghly, Rupnarain, Ganga, Brahmaputra, Barak, Mahanadi vari, Krishna, Cauvery and Narmada an Saurashtra Coast. Two *Hilsa* Fishery were established during the period collection of catch statistics from th Padma, Godavari and Krishna. The E and Riverine Sections and the Chilk Investigations Unit of the Central Inlan eries Research Station have organi collection of *Hilsa* catch statistics fr areas of their operations and the Central Fisheries Research Station has arran collect the statistics of marine landings Efforts are being made to cover the re areas through the co-operation of th Governments.

There has been an unusual sca *Hilsa* in the catches of many of the riv 1956. In the river Hooghly where investigations are under way, it h observed that the plankton population been at a very low level since 1956. In t Cauvery, abundant catches of Hilsa wer in the months of July-August in 1956 a This appears to be related to the unusual of the river below the anicuts on accou surplussage from the Mettur reservoir.

The age and size composition stage of maturity of the commercial ca all the rivers are being studied. To d the success of spawning and the abund larvae and young fish in the rivers, surveys are being carried out in th Hooghly and these surveys will soon be e to other rivers also.

Morphometric and meristic char large samples of *Hilsa* from all the river and from the Saurashtra coast were st demarcating the populations. The an data carried out so far indicate that mo have independent or semi-independent tions. Detailed analysis of the data i gress. Tagging experiments have recen initiated with a view to studying the mi and intermingling of populations, if any the mortality rates.

sample of *Hilsa* specimens, preserved ldehyde was received from Burma for idies. On account of the rather poor preservation of the specimens a detailed tive study of the non-meristic characters nd difficult. The meristic characters ever, being studied.

Malaya) Mr. Talbot's report will be of although we have no Hilsa fishery.

apan: Dr. Kuronuma) Mr. Talbot's welcome.

957: " . . . Member Governments were urged to utilize the *Current Affairs Bulletin* of the Council for the exchange of information on this subject."

apan) As to the fishery in the East ea, the most prolific trawling ground to Japan, researches have indicated a ble species selectivity of the fishery. is fact it may not be safe to conclude letion in the amount of catch always a decrease in the population size of that In some other regions, cruises of vessels were successful in discovering vling grounds.

Malaya) Quite extensive trawling operare carried out by the Fisheries departvessels the M.V. KEMBONG and the IANIHINE of the Marine Research Singapore. I believe these works have n published. The areas covered were its of Malacca, area off the northern tip tra and the East Coast of Malaya and the South China Sea, adjacent to the Sarawak and North Borneo.

Australia) Investigations on flounder head have been completed and the re being prepared for publication. The wealth Government has under con- n a plan to purchase a modern trawler out tests of the potential trawling in the Great Australian Bight.

ndonesia) Exploration for shrimp grounds adoption of the shrimp trawl has been ed with the research vessel MUNA. l 1957: South-east of Kalimantan, 30) hauls, 233 kg. shrimp, 1,680 kg. fish ng Pasir); (b) Sept.-Oct. 1957: North of Central Java, 60 hours, 80 hauls, 1,691 kg. shrimp, 643 kg. fish, the best haul, was a 60-minute haul with 386 kg. shrimp and 20 kg. fish; (c) April-June 1958: East coast of Sumatra, 128 hours, 155 hauls, 80 kg. shrimp and 3,082 kg. fish. Papers which will be submitted to the 8th IPFC Session are: (a) Technical papers on: Craft and gear utilized in the *Rastrelliger* Fisheries; *Rastrelliger* landing 1954-1957; Standardization of plankton nets. (b) Symposium papers on: "Fish behavior with special reference to pelagic shoaling species": on "Lemuru" (*Clupea* sp.), and on "Lajang" (*Decapterus* sp.).

National resources for the study of basic productivity of the sea

1957: " . . . The Council noted that a symposium on the "Measurement of Primary Production in the Sea" would be held in Bergen, Norway, in September 1957 and decided to formulate recommendation on this subject only after full consideration had been given to the views expressed and conclusions arrived at during this symposium."

The Committee was furnished with a report by Mr. Laevastu on his participation in the ICES/UNESCO Symposium on basic production, which took place in Bergen in 1957, and a report on his participation at the meeting of the Hydrographic Committee of ICES. The Technical Secretary will be able to give at the meeting an account of his participation at the 1958 meeting of the UNESCO International Advisory Committee on Marine Sciences and the meeting of the ICSU Scientific Committee on Oceanic Research.

(Japan) Recently quantitative studies of vitamin B_{12} and radiochemical methods using carbon 14 have been applied to determining basic productivity of the sea adjacent to Japan. Workers in several universities have carried out fundamental studies including pure culture and metabolisms of phytoplankton to contribute to development in this line of science.

(Malaya) The reports by Mr. Laevastu are timely and will no doubt be of great help to our research officers.

(Australia) This is one of our major projects and work is proceeding along two main lines (1) a survey of various Australian waters

for phytoplankton, zooplankton, benthos, pigments, nutrient salts, and rate of photosynthesis (14c 0_2 studies); (2) laboratory and field studies designed to improve methods and to give more accurate interpretation of results. The aim of the work is to assist the discovery of areas which might sustain fish populations and to assist the interpretation of fluctuations in fish abundance.

Faunal changes

1957: "... The Council would urge Member Governments to use the *Current Affairs Bulletin* of the Council to keep one another informed of such fluctuations."

(Japan) In regard to some of the major species in the waters around Japan, distribution and amount of the commercial catch have more or less changed in recent years. For instance, fishing grounds of the herring and large-sized sardine have moved northward; while the commercial landings of some species such as the anchovy, saury and horse mackerel have tremendously increased. A small scale but remarkable faunal change related with oceanographical modification took place in boat seining grounds off the Pacific coast of Honshu. During the last ten years or more, except 1957, the fishery operated in the area landed a great amount of very young anchovy. In the exceptional year, the commercial catch chiefly consisted of the young sand-lance instead of the anchovy, while the coastal waters extended over the fishing ground in the results of the Kuroshio current having moved further south than usual. Referring to an extensive faunal change, however, scientific investigations are under way to see if the anomaly in these fisheries is really related with a long-term climatic modification.

(U.S.A.) The U.S. Fish and Wildlife Service has had under way at Stanford University for the past two years an investigation, the aim of which is to relate meteorological changes to changes in the fisheries. Activity to date has been focused on developing approaches and assembling the necessary meteorological information. It is anticipated that published reports of this investigation will begin to appear in a year or two.

Studies conducted by POFI on the responsible for seasonal and annual va in the abundance of skipjack tuna in suggest that changes in the fish abundanc related to changes in the ocean circ Good skipjack tuna fishing in Hawaii s be related to downstream California type water bathing the island so that wh water mass does not influence the H Islands area, a very poor skipjack season Though it is not now possible to spec precise meteorological events that lead changes, it is quite certain that fluctua the weather are the basic cause. Cons research is necessary to tie the weather in a functional manner, but it appear possible and very worth-while for succes permit a measure of prediction.

The problem of adequate catch s is pertinent here. We have been hand because prior to World War II catch s were not complete and adequate in This has restricted our investigations post-war period. If I may be permitt editorial comment, establishment of a for gathering and recording accurat statistics is an absolute essential and receive priority over any other type of investigations. There is practically no study that can be conducted successfull absence of good catch statistics.

(Australia) During the past six 10-12 new records of fish from temperate have been made in Tasmania. In additio has been a southerly extension of th prawn into Tasmanian waters.

Oceanography

1957: "... decided to request Governments to consider th bility of sending their and water temperature dat Secretariat to be publish made available to all countries."

See reference above, under 2.32 meetings of IACOMS and SCOR.

(Japan) For the purposes of ob data required for study of marine resour predictions of fishery conditions in J waters, oceanographical observations ha conducted for a number of years inclu

Regional Fisheries Laboratories belong-
ie Central Government in co-operation
Experimental Stations of Prefectural
nents. In addition, different types of
raphical observations have been carried
regular intervals of period by the
logical Agency aiming at marine
ogical investigation and by the Hydro-
Office, Maritime Safety Agency, for
safety in navigation. In various
of the surveys, the Fisheries Research
ons are keeping in touch with those
s. It has been emphasized that
logical improvement and reorientation
ographical studies should be required in
contribute to marine fisheries. For
urposes meetings of many research
from various institutions and laborato-
re convened several times during 1957
Ministry of Agriculture and Forestry
nstructive conclusions having been
rom discussions on the problems.

J.S.A.) The Pacific Oceanic Fishery
ations is issuing on a current basis a
chart of sea surface temperatures in
h-eastern Pacific. The area of the chart
from 180° east to the Pacific coast and
o 20° N. These charts are based on
nt Marine records and are issued appro-
y 10 days after the close of the observa-
iod, that is the 20th of the month in
. In addition, we have established a
of sea temperature and salinity monito-
tions in the Central Pacific. These time
will be published as data accumulates.
terial, of course, is very pertinent to the
of faunal changes discussed above and
tely essential if the relationship between
, ocean and fish is to be unravelled.

Australia) Our data are published quar-
Station Lists and Cruise Reports. We
re is no need to send anything to the
as the data are already made available
braries in member countries.

Thailand) Regional project on the
investigation of the South China Sea
Gulf of Thailand under the technical and
ic assistance of ICA as requested by the
nent of Vietnam and Thailand, will
1959.

Tuna

1957: " . . . recommended the adoption by Member Governments of the principle of the 1° square as a basis for organizing the collection of catch statistics."

(Japan) The Nankai Regional Fisheries Research Laboratory conducted surveys on the commercial fishery of four major species of tunas and tagging experiment of the albacore in the Pacific and Indian Oceans along with oceanographical condition in the areas. From view points of the fishing biology it is worth noting that different groups of the fish seem to inhabit different current systems, and that strength of year classes fluctuates remarkably from one another.

(Malaya) I have no material to bring up. It might interest you to know that the Federation Government has obtained a tuna expert, Mr. Y. Momokawa, from Japan, under the Colombo Plan, to make a survey of our tuna resources. He will carry out long-line fishing for tuna with the departmental vessel, the 72 ft. M.V. KEMBONG. Long-line fishing gear has been ordered from Japan and will be arriving in six weeks' time.

(Australia) The tuna programme is being expanded. For example, a "Fisherman's Asdic" (Kelvin Hughes) has been fitted to the tuna research vessel and the instrument (with a range of two miles) will be used to search for off-shore schools. With the recent appointment of a hydrologist especially for fisheries problems, the relation between fish occurrences and environmental conditions will receive increased attention. Work is continuing on the correlation of tuna occurrences with movements of offshore water masses.

(Indonesia) With the research vessel BIMA some experimental fishing with the longline gear has been done on the West Coast of Sumatra during the months September-October 1957. Rastrelliger fish were used as bait while yellowfin was the most abundant species caught. A survey on the tuna fishery with trolling is still in progress.

(U.S.A.) POFI tuna research is reported in full in the attached Annual Report. Work being conducted by other American institutions will no doubt be included in the Rapporteur's report. Though redundant, it might be worth

repeating here that POFI has embarked on an ambitious program on tuna behavior research. This program is aimed at accumulating the knowledge needed to increase the efficiency of catching tuna. At the present time we are exploring an underwater observation chamber, which we have fitted to one of our vessels. This chamber permits us to observe the behavior of tunas during the course of fishing.

Rastrelliger

1957: "... The Council decided to request FAO to initiate arrangements to conduct a special short seminar to train technical officers in the standard techniques recommended in IPFC/C57/CP 1. ... The Council agreed to request FAO to assist in drafting a provisional programme of work for the expert for circulation to interested Member Governments for approval."

The International Training Center on the Methodology and Techniques of Research on *Rastrelliger* has been conducted, as requested by the Council. A report of the Center will be presented by the Technical Secretary at the meeting.

(Pakistan) Amongst the mackerel, *Rastrelliger* has very little importance as it is found in very small numbers in Pakistan waters. This has already been reported previously and hence no work on this species has been undertaken in this country. The research is in a very initial stage in this country. A research station is under construction at the Karachi Fish Harbor and the staff is also being trained so as to start work as soon as the facilities are available.

(Malaya) The Federation Government is sending three research officers to the Center in Bangkok. They are all new to fisheries research and will no doubt derive much benefit from the Center. Two of them, Mr. Selvarajah and Mr. Merican, have just returned from a three weeks' course at Tokyo on "The Application of Radio-isotopes to Research" under the auspices of UNESCO.

(Indonesia) During the inter-session period, data on the landings of *Rastrelliger* and its fishing gear were collected, primarily to be used for the *Rastrelliger* training ce Bangkok this year. In March 1958 sam *Rastrelliger* were received from the Phili Indonesia has already sent samples to Sin India and the Philippines.

(Australia) This fish is rare even tropical north coast of Australia and it intended to carry out research upon it.

Seaweeds

1957: "... Workers in this fiel urged to submit their nam addresses as well as the t their papers for listing *Current Affairs Bulletin*."

(Indonesia) Samples of "aga collected from different areas in Indones sent to the Rijksherbarium, Leiden (H and some to Australia to be identified.

3. APPLICATION OF RESEARCH RE

The following is an extract fr second circular letter from the Te Secretary:

" In Dr. Kuronuma's letter acknowledging the first circular le makes a strong plea for orientation research work to practical problem points out that it is not sufficient t research work should be interes the researcher personally but sh able to produce results that will be by the industry. You may rememb at the Seventh Session we ha discussion of this point and I thi it is not out of place to point o at other councils the discussio take place relate as closely as p to the practical problems conf the industry and the adm tors. In fact in certain of the c the discussions are initiated by t mission to the scientific commit questions formulated by the admini on behalf of themselves or of the in These questions may be simply form of what size should such a species be caught, and, what siz should be authorized for the cap fish of that size? I believe it w useful if Committee members wo to identify problems of this kind to the fisheries of their countri

rhaps at the Council's session the enda of the Committee might be framed the basis of a review of such questions bmitted by Committee members."

(alaya) I heartily agree with Dr. ıa's views, and I agree that a review of oblems as confronting the fisheries rator, at the Council's session, would ible to all concerned.

apan: Dr. Kuronuma) I shall emphasize nat fisheries research work should be interesting to the researcher per- ut also should be able to produce results l be usable by the industry. The ation of the research subjects will be necessary before the adoption of the for prosecution.

ingapore) I agree with your view that be useful for Committee members to entify problems relating to the fisheries countries and present them for discus- the Council's Session. If there is no lo so at the Council Session they could put on the agenda of the next Council This would certainly help to keep the rators in the various member countries d and to help them to appreciate the the IPFC. I would therefore suggest might wish to take this point up with b to see if it is possible to initiate ow for the forth coming meeting at

FISH BEHAVIOR SYMPOSIUM

apan: Dr. Kuronuma) The title of the um proposed for the 8th Session was ed at Bandung as "Fish behavior with reference to pelagic shoaling species". ecision of the title of the symposium as remember that we have considered it y to cover the fish behaviour demon- by them living not only in open natural f water but also by those which are in fish-ponds. The idea was based on on, I remember, that the scope of the um will not be restricted to Panel B isheries). The Prospectus for the um on Fish Behavior (FAO/58/6/4429) the subject very clearly in principle method of research. As the principal f the fish behavior study the Prospectus hasized, I was impressed, the "search for fish (to catch)" and "characteristics of a population .. dynamics in terms for number and biomass". I do not need to mention that the understanding of fish behaviour is one of basic knowledge to manage the fish-pond of higher productivity for the consideration of water supply, application of food, construction of pond as well as harvest of the products.

(Singapore) The plan set out in the prospectus on the Symposium on Fish Behavior is very good.

(Australia) The question of Australian representation at the next IPFC meeting has not been settled and we have therefore taken no steps to prepare any material. I was extremely pleased to see under Section II of the Prospectus that attention will be paid to questions (i) and (ii). It is most important that the first question be kept in mind lest any investigation drifts into purely academic research. With our present state of knowledge, fish behaviour programs prosecuted at fisheries laboratories must include much fundamental experimentation. However, it is necessary that clearly-defined practical objectives be kept in view.

5. REPORT TO TECHNICAL COMMITTEE I FROM THE GOVERNMENT OF KOREA

The following report is a paraphrase of a more elaborate document submitted by the Bureau of Fisheries, Republic of Korea to the 8th Session of the Indo-Pacific Fisheries Council.

Taxonomy: A list including 833 species of fish has been prepared by the Director of the Central Fisheries Inspection Station. The method of classification adopted is that used by Berg.

Age Determination: Scale studies reading to the age determination of 3 important species of fish are at present being undertaken. The fish studies are the Alaska Pollock, *Theragra chalcograma;* Corvena, *Pseudosciaena manchuria* and Snapper, *Pagrosomus major.*

Plankton Study: Quantitative vertical collections of plankton have been undertaken at the Central Fisheries Experiment Station since 1945 using the Marutoku-A45 plankton net.

Seaweed: A publication has been issued listing 366 species of marine algae and including the standard Korean names

together with the names in the dialects of the Kyunggi Province and of the districts in which the species are mainly collected.

Tuna: Exploratory fishing for Tuna has been undertaken by a 230 ton vessel which operated through the Straits of Malacca and in the Indian Ocean in the vicinity of Andaman Islands.
Two other vessels have already left to study tuna occurrence in the Southern Pacific.

The trawl fisheries: The report includes a description of the gear and methods used in fishing for the Alaska Pollock, operated in the Korean inshore waters.
Statistics of catch by area, by month and by year are given.

Mullet: A description is given of the artificial spawning and rearing of gray mullet at the Mokpo Fisheries Station. Data on rate of hatching, water requirements and rate of growth are given together with some notes on feeding and on the future of mullet culture in Korea.

Water Pollution: Notes on effect of coal ash discharge into Chinhae Bay are given and it was indicated that such a process had adversely affected the inshore marine fauna, apparently owing to increased turbidity of the water and the deposits of fine ash on the bottom, which inhibited the growth of benthic organisms.

Inland Fisheries: Production in metric tons of 7 species of freshwater fish during the period 1951-57 are given together with an estimate of the area of inland water suitable for fish culture which in 1956 was approximately 556,000 acres.

Oceanography: Studies on the temperature and temperature variations on inshore water, on the variation of salinity of the eastern sea of Korea and studies to identify water masses with a view to relating these water masses to particular type of fisheries are being undertaken.

Shrimp Fisheries: A description of the results obtained by the use of Gulf of Mexico shrimp trawls is given but it is emphasised that the early experiments were in connection with training in the use
It is planned to use this type of
ment for exploratory fishing in
deeper than are at present being ex

CHAPTER 3. TECHNOLOGY AND ECON

The Technical Committee II ex
IPFC/C58/WP 6 together with IPFC/C5
Corr. No. 1 and Addendum (1) and (2)
of the view that this document repre
fairly comprehensive account of the activi
the Council, Member Governments and
during the last inter-session period
implementation of the various recommen
made by the Council at its 7th Session
field of Fisheries Technology and Eco
The Committee revised WP No. 6 in t
of the Corrigendum and Addenda r
The revised version of WP 6 was cir
as IPFC/C58/WP 6: Rev. 1.

The activities of the Committee
the current Session are described in this
which records the evaluations of the info
contained in the documents listed a
well as recommendations for further a
during the next inter-session period.

In addition, the Committee has ex
its views and made recommendations on
other matters, such as the mechan
efficient and effective implementation
Council's recommendations, publication
Council and the Indo-Pacific Fisheries
The Committee presented its re
proposed that this be considered by the
for adoption.

GENERAL

Examining the various documen
sented to this Session, the Council ex
the opinion that there was considera
balance in the development of the various
and aspects of the fisheries industry
region. While relatively strong empha
laid on increased production of fish, the f
for handling, transportation, processi
marketing continued to be unsatisfacto
inadequate. The Council was also
opinion that such inadequacy was obvi
strong deterrent in itself to further inc
production.

The Council also observed that p
the development of fisheries were not
coordinated with similar plans for deve
in other sectors of national economy.

e Council stressed the need for ed development of the various aspects eries industry as well as a coordination es development programs with those sectors of national economy.

FT AND GEAR

) The Council noted that in the fields and gear some further progress had ieved during the last inter-session r a number of countries in the region. rtage of qualified and experienced ical experts available to Member ents for the supply of advice in these ly related fields had, however, resulted continued failure by a number of to overcome long outstanding difficul- which they were faced. With a ffecting some measure of coordination er exchange than is at present possible y available information on the progress in certain of the countries which could tageously adopted by their less advanced s, the Council decided to ask FAO, if explore ways and means of increasing blishment of the Regional Office in by the appointment of one further Officer who might be expected to e in craft and gear. Following visits to he Member Government countries, the question would soon become con- with what was taking place in the fter which he would be in a position to hat was applicable elsewhere and how ects that might be considered desirable est be brought about. It was felt, ore, that many of the problems which mber Governments, and, which are of ing importance among the fisherfolk articular countries concerned, could be with on-the-spot advice given by this al Secretary to the individual fishery

) On the question of design and con- of improved types of fishing craft with sideration to economics, the Council ith satisfaction that a second World Boat Congress is scheduled to take Rome during April, 1959. In view of ortance of this subject, and, bearing the success and practical value of the ion "Fishing Boats of the World" which from the first Fishing Boat Congress, ncil decided that the Secretariat should write to Member Governments enquiring whether it was their intention to send a representative and, if so, whether it would be possible for the officer concerned to keep a watching brief on the interests of the Council.

(c) An account of the work done by FAO in India and Ceylon on the development of mechanized beach landing craft designed to pass through moderate surf was studied in the form of Working Papers Nos. 5 and 27. It was appreciated that work to date had been of a trial nature and, as further conclusions were expected to be reached during the forth-coming inter-session period, it was decided that FAO should be requested to present its report at the next session of the Council. The FAO expert present explained how there is a vast difference between beach landing craft required to pass through surf and the type of vessel required to be beached in sheltered bays or in areas where there is little or only light surf; the latter class of boat being much cheaper to build. It was decided that the Council should obtain from Member Governments an indication as to whether they were interested in either beach landing and/or surf boats and, if so, details of the conditions under which such craft would be required to be used.

(d) The problem of vocational training for boat builders and the work of the FAO assisted training center in Cochin, India, as well as the progress made in a number of other countries, were discussed at length. The recommendation at the seventh session of the Council has been that training should be provided to enable boatbuilders to read working drawings and to produce boats from those plans. On further reconsideration, the Council now thought that whereas the earlier recommendation was applicable in the rather more advanced countries in the region, in the less advanced countries the real need in the first instance was to train boatbuilders in modern carpentry work. The Council accordingly decided to urge Member Governments to appoint suitable well qualified men as Craft Technicians, in the establishments of their Fishery Departments, to carry out this training work at the appropriate levels. The FAO might assist by supplying copies of literature from the various courses which it had either sponsored or assisted and Technical Assistance reports.

(e) At the previous session of the Council, FAO had been requested to study the possibility of producing a reference book on the techniques of construction of small fishing boats. The FAO officers present at the current session explained how although there is already a considerable amount of literature available, none of this has yet been incorporated in a book. The acquisition of funds and, also the period of time required, for producing such a book would present problems. The Council accordingly decided instead to request FAO to release whatever material it may have, if necessary, in mimeograph or pamphlet form.

(f) The Council expressed its satisfaction in the efforts underway in the region for mechanization of fishing craft and expressed the hope that Member Governments will intensify their efforts in this field. Whilst it was appreciated that the installation of engines in fishing boats was an important advance, the Council felt that in order to reap the full benefit the mode of operation must also be suitably modified and intensified (i.e., to extend the range of fishing grounds and to handle more or new types of gear).

(g) The introduction of mechanical aids to assist in the handling of fishing gear was discussed and details were provided of a number of different types of equipment (e.g., line haulers, capstans and winches) which could be introduced in even quite small mechanized boats, in countries where these are not yet being utilized. In this connection, the Council noted with interest that the proceedings of the "International Fishing Gear Congress" sponsored by FAO in Hamburg during October, 1957, would soon be available in printed form.

(h) A number of papers on the subject of improvement of fishing gear were studied; particular attention was paid to the use of light fishing which although important in the eastern sector of the region has still been largely neglected in the western sector, and, the introduction of the new types of high opening trawls developed and widely used in Northern Europe during the last decade. The Council expressed the hope that Member Governments would make available to their fishery workers the necessary funds required to test these forms of gear, both of which when used in conjunction with sensitive echosounders had produced excellent results elsewhere.

(i) The Council was briefly infor the deliberations at a Symposium on "Im Types of Fishing from Small Mechanized held in Cochin, India, between the 28 31st October, 1958, which had been inaug by the Director of Fisheries, Kerala State papers from this Symposium were cons to be of considerable value throughout the and the Council therefore decided th Government of India should be approache a request that, in all cases where the s are still available, further copies o papers may be produced for distribut Member Governments.

(j) The Council decided that the recording echosounders of the modern im types should be encouraged particula exploratory and experimental fishing, fro ernment boats in the first instance. portable, low cost, echosounders which o from batteries are readily available.

(k) Only one paper was received subject of gear preservation and thi studied with close interest. Attentio drawn to the importance of fixing chemically after tanning treatment, or protect it by tarring (i.e., coal tar dilut kerosene in a 3 : 1 mixture).

(l) The increasing use of synthet ing twines throughout the region, parti nylon drift and bottomset gillnets whic been found to be vastly superior to natura nets, was noted as being of the greate portance. Large scale introduction of syn fiber nets is however being delayed by l capital among the fishery operators and i instances by currency and import restri To date Governmental loan schemes have applied mainly to the purchase of engin for boat building. The Council recomm that due consideration should in future be to extending such credit facilities fo purchase of modern gear.

(m) The Council noted from r that while weather forecasting services operated in almost all the countries in the r such information often is not readily av to the fishermen as they do not possess w receiving sets.

(n) The training of fishermen in n tion, seamanship and engine operation subject that received much attention.

expressed its approval of the measures aken by most Member Governments to he necessary training facilities and ex- he hope that this would be expanded ier.

) There were, however, indications veral countries of the Region, fisheries ent and the consequent increase in n of badly needed additional supplies otein, was being seriously hampered igid enforcement of either outmoded n or legislation applicable to other vessels (e.g., large ocean going ship- /or craft normally engaged in the carry- are-paying passengers). Such action lted in impracticably high standards t for the certification of fishermen s and engineers, for the safety require- id down such as the number and type ving appliances to be carried on board essels, and harbor entry and clearance e.

) The Council considered that it was to point out to Member Governments enforcement of any measures which it necessary for fishermen to recruit ed personnel from outside the fishing not only tended to delay progress but oduced new social problems and was, se, usually unnecessary. Professional n with their traditional skill of seaman- l ability to return to port under sail e engine fail, are not normally a source le to the Government administrator. tice in most countries is to accept a form of certification with a lower than that applicable to other categories s, which is valid for bona fide fishing y. These standards are then gradually er a period of years as the benefits from zation result in a higher standard of ith a better educational background, for atives in the industry. Similar relaxa- the standards of safety requirements for fishing boats is also recommended.

) The Council noted with satisfaction recommendation for the publication of a phy on fishing gear and methods made eventh session had been implemented and the book duly distributed.

was decided that the work of Technical ee II on Craft and Gear during the next sion period should be continued on the g phases :-

(i) Improvement of craft
  (a) Design and construction with due consideration of economics.
  (b) Mechanization of fishing craft.
  (c) Vocational Training for boat-builders.
(ii) Mechanized handling of fishing gear.
(iii) Improvement and preservation of gear.
(iv) Training of fishermen in navigation, seamanship and engineering.

FOOD TECHNOLOGY

(a) Although the Council has in the past made various recommendations for the improvement of the quality of cured fish in this region and Member Governments have undertaken certain activities in this respect, the quality for cured fish has not so far been precisely defined with particular reference to this region. In the absence of such definition, the efforts for the improvement of quality have not always been properly directed. After considerable deliberation on this question, the Council agreed that quality for cured fish in so far as the Indo-Pacific region is concerned must recognize consumer preference, in the Member Countries, for varying degrees of putrefaction and/or fermentation insisting at the same time however, that the products should be free from factors physiologically harmful to human beings.

The Council emphasized that the order for measures for the improvement of the cured fish industry to be effective, steps should first be taken to ascertain the quality of the various products as produced at present and the causes responsible for any lowering of quality, should such be the findings. As the defects in the industry are defined in precise terms and suitable measures for eliminating such defects are found out, practical steps should be promptly taken in applying suitable remedial measures.

In respect of research conducted in the region in fish curing, the Council made the following observations :

(i) efforts for developing techniques for determining quality have been directed to methods which may not

find application in the determination of quality as defined in the foregoing paragraph;

(ii) although a considerable amount of research has been undertaken in the techniques of fish salting relatively less emphasis has been put on the techniques of drying, storage, handling and packaging;

(iii) there is a dangerously wide gap between research and application of research results in the industry.

The Council recommended that research should be encouraged only where the problems have been clearly defined and there is a pressing need for a solution of such problems. The Council particularly stressed the need for meticulously examining the priority to be assigned to various problems. The Council recommends to Member Governments that prompt and adequate measures should be taken to apply results of research in the industry.

Discussing the possibilities of artificial drying, the Council agreed that the desirability of such drying should be considered where wastage of fish caused by unfavourable weather and the necessity for expeditious drying of large quantities of fish during short periods of heavy landings may justify the introduction of mechanical drying. Care must be taken that such mechanical dryers are of very simple design, can be fabricated locally and do not call for heavy investment. In this connection it was pointed out that in order to meet the consumer preference for certain degrees of putrefaction in dried fish, fish dried in artificial dryers may, in the earlier stages of drying, have to be aged for suitable periods to ensure the development of the desired degree of putrefaction. It was also suggested that, where applicable, Member Governments might like to consider the advantages of employing artificial drying for quickly reducing the initial moisture content in fish below the critical level in order to arrest spoilage which takes place above this critical level. The fish so partially dried could subsequently be further dried in the sun.

It was agreed that considerable damage of cured fish during storage and shipment is caused due to re-absorption of moisture.

It was observed that this wastage, to a large extent, could be avoided by packaging dry fish in relatively moisture-proof materials. In this connection, the Council suggeste Member Governments might like to inve the possibilities of using paraffin-linec bags or gunny sacks lined on the insic bitumen.

Recognizing that improper sanita the fish curing and drying yards in the are responsible to a considerable extent poor quality of the products, Council mended to the Member Governme encourage the fish curing yards to in simple and practical measures of san These might include simple measures vision of running water, general cleanlin drying of fish on racks or raised platform out of indigenous material. The Coun convinced that fish flour in its strictes (deodorized, de-colored and de-fatte powder), does not seem to have any sig possibilities in the region at present. quality fish meal might be acceptable countries of South-East Asia where fishe ducts with pronounced flavor, such as fis and fish paste, are already popular items However, consumer preference and resist new products as well as economic conside might make it desirable to process surpl wherever available, into forms which are accepted by the consumer.

(b) Arising out of the discuss fish flour for human consumption, consi attention was paid to the possible produ fish meal. The Council observed that off trimmings from fresh fish and cured fish i are not of sufficient quantity to warrant es ment of a fish meal industry. The further observed that production of fis from whole fish for poultry and animal would be justified only where fish is p in certain areas during periods of ver duration in quantities far in excess capacity of the existing facilities to utili extra quantities for human consumption.

(c) The Council was strong in it that the establishment of the fish meal i must be preceded by a very careful exam of the economics involved. The Council with interest the two documents (Te Paper No. 3 and 17) submitted by In describing investigations conducted in t ning of fish. The Council drew thes Technical Papers to the attention o member countries where canning is of

The Council recognized the limited ...ies of fish canning for catering to the ...rkets in the region. The needs of the ...Services might in certain countries call ...oping fish canning on a limited scale. ...vailable resources and an organized ...stify production of canned fishery pro... ...ch as canned tuna and shrimp for export ... the industry may be encouraged. ..., in view of the inherent difficulties in ...urement and operation of canning ...y in this region and in obtaining con... ...pplies of tinplate and in the market... ...e finished products, the organization of ...stry should be promoted in partnership ...ablished concerns in countries where ...of fish is well developed.

...) The Council read with great interest ...al Paper No. 9 describing investigations ...d Fish which is a commercial product ...and, Malaya, Vietnam and some other ...s in South-East Asia. The Council ...hat Boiled Fish represents a very simple ...ictical means for preserving fish for ...riods. In consideration of the general ... of the region, and the limitations ...sportations and handling facilities, ...ncil was convinced of the possibilities ...oping this product in other countries ... region. In this respect the Council ...that a comprehensive report on the ...will be a helpful guide for the Member ...ents in their consideration of the ...ties of developing this product. The ... therefore directed the Secretariat to ...quate measures for the early publication ...a document in cooperation with FAO.

...) The Council reviewed its recom... ...on made at its 7th Session to FAO for ...ng a Regional Training Center in fish ...ng and preservation. Considering the ...c and dietetic importance of cured fish ...gion and further considering the present ... the fish curing industry for expeditious ...ment, the Council agreed that it would ...able for the proposed Training Center ...itself to Fish Curing in Humid Tropics ...cial reference to the Indo-Pacific region, ... of covering the wide field of fish proces... ...l preservation. The Council suggested ...s Training Center should primarily aim ...ng as precisely as possible, the defects ...ish curing industry and in suggesting ... remedial measures.

The Council recommended that participants of this Training Center should be selected from those fishery officials in the member countries who are actively engaged in research in fish curing and in the administration of the fish curing industry. The Member Governments were requested to send, where possible, two participants, one from the field of research and the other from administration.

In preparation for this Training Center, Member Governments should compile all available information:

(i) for the preparation of as complete an account as is possible of the fish curing industry, furnishing information, among other factors, on manpower, plants and equipment, capital investment, quantity of raw material utilized, processing methods, varieties and quantities of final products, methods of handling, storage and packaging, consumer preference for various products, price of these products as compared to those of other protein foods;

(ii) an account of research so far conducted in the various aspects of the fish curing industry; and

(iii) an account of the measures so far implemented and/or contemplated for improving the fish curing industry.

In this connection, the Council pointed out that information collected for the "Fishery Products Manual" in accordance with the proforma distributed by FAO at the 7th Session of the Indo-Pacific Fisheries Council could be profitably utilized at the Training Center.

(f) The Council re-examined its recommendations made at the 7th Session to FAO for a Regional Consultant in Fish Processing and Preservation to be stationed in Bangkok, and agreed that this recommendation should be further re-examined at the Training Centre on Fish Curing for Humid Tropics recommended at the current session.

(g) The Council noted that very little progress was made in the preparation of the "Fishery Products Manual". Notwithstanding the materialization of the Training Center

requested in the foregoing paragraphs and in recognition of the fact that a factual account of the fish curing industry in the region was a primary step towards improvement of the industry, the Council decided to concentrate during the next inter-session period on the preparation of the Fishery Products Manual. It urged the Member Governments to cooperate with the Council and FAO in this respect.

3. STATISTICS

(a) The Council reviewed its recommendation at the 7th Session on the need for the development of suitable sampling techniques for the collection of fishery statistics in this region and was of the view that the forthcoming Training Center in Fishery Statistics due in Bombay early in 1959 would, to a considerable extent, satisfy this need.

This Council therefore recommended that the Member Governments take full advantage of this Training Center. It also urged the Member Governments to utilize the services of the participants who will have been trained at this Center, in the practical application of the sampling techniques in their respective countries for collection of statistics.

The Council reviewed its recommendations made at the 7th Session for a Group Country Project in Fishery Statistics and was of the view that such a project should be deferred until after the forthcoming Statistics Training Center in Bombay is completed and the Member Governments have had an opportunity to examine the reports submitted by the participants from their respective countries.

The Council examined the relative merits of collecting fishery statistics by a Central Statistical Organization and by fisheries departments with their own staff. Information was made available on the systems of centralized collection of statistics in Australia where one single organization is responsible for the collection of official statistics relating to primary as well as secondary industries and on the system in Japan where primary statistics of Agriculture, Forestry and Fisheries are collected by one single organization.

Considering the limitations of technically trained personnel, of equipment, and of funds available, the Council suggested that Member Governments might consider the desirability of centralized collection of statistics. I however specially stressed that such cent statistical organizations should have on staffs officers specially trained in the col of fishery statistics and that such officers be made available for collection of statis fisheries in preference to those in other fi

Arising out of discussions of the Handbook for preliminary fishery surveys, was made that this handbook had not, i cases, reached the personnel connected d with the conduct of fishery surveys. The C requested FAO to ensure a wider distri of this handbook and the Member Gover to promote its use, wherever possible. It requested the FAO to establish direct c with the fishery workers in the reg ascertain their experience in the use Handbook.

The Council examined the proposa by Economics Branch FAO Fisheries D for a Fishery Surveys Training Center countries of the Indo-Pacific region a pressed the view that such a Training was desirable. The Council recommend the Training Center should deal with the s of formulating coordinated program fo eries development and that the particip the Training Center should consist of Fis Officers who are directly concerned wi planning of fisheries development pr in their respective countries.

(c) The Council noted in this c tion the recommendations made at the 4t Regional Conference for Asia and the F regarding the organization of Semina representatives of fisheries services the general economic policy and pl agencies of governments and recommend the Training Center should also tak account matters intended for considera the proposed Seminars.

Reiterating its stand on the esse of reliable and comprehensive fisheries st in the planning of a coordinated develop fisheries, and being conscious of the limi of trained personnel, equipment and the Council repeated its recommendations Member Governments for implementing a a minimum programme of statistics. minimum program as outlined at th Session is:

(h) Census of the number of fishing vessels operating in member countries, the number of fishermen engaged in the industry and fishing methods used, together with cold storage and processing facilities.

(i) Collection of statistics on overall fish production together with statistics on utilization and trade in respect of species of major economic importance.

The Council further requested the Member ments to make available to the Council mination at its next Session, their on the implementation of this minimum me.

CIO—ECONOMICS

(a) The Council studied the Report ed to the Session by FAO on the ional Training Center in Fishermen's tives and Administration held in a during December 1957 and January The Council expressed its appreciation O for successfully completing this g Center. In this respect the Council Member Governments to make full and e use of the services of the participants ering fishery cooperative activities in untries.

The Council examined the Report on the of Fishermen's Cooperatives in the egion contained in Volume 2 of the on the Training Center and noted that countries of the region there has been spontaneous growth of Fishermen's ative Societies, and the impetus to the ation of such societies has come chiefly overnments. The Council further noted view of the educational, social and ic standards of fishermen in the region, was an urgent need for intensification of on work in the member countries for editious development of Fishermen's atives.

The Council observed that for successful on of cooperative societies, the following essential requirements :—

(i) close cooperation of members ;

(ii) efficient management ;

(iii) economic turnover.

The Council was further of the view that membership of Fishermen's Cooperative Societies should be homogeneous and that wherever possible, the Societies should expand their activities to include marketing of catches of their members.

The Council urged Member Governments to assist Fishermen's Cooperative Societies in fulfilling the requirements mentioned above, by educating the fishermen and providing loans where necessary. Governments assisting these societies should, however, exercise a minimum of control over them.

The Council was of the view that where organization of Cooperative Societies for undertaking marketing of fish and fishery products were not possible at present, the Government might consider the promotion of autonomous bodies as a temporary measure to undertake these activities until such time as the fishermen organized themselves effectively.

Examining the Report on the function of the middleman contained in Volume 2 of the Report on the International Training Center in Fishermen's Cooperatives and Administration, the Council expressed the view that the Report is primarily based on preliminary observations made during a study currently in progress in India (Bombay), Hong Kong and Malaya. The Council recommended that the study in these countries should be completed and that further extension should be considered after a report on this study has been examined. The Council also emphasized the necessity of close collaboration between Universities and other institutions with the Fishery Departments in pursuing this study.

In consideration of the various controls exercised by middlemen in the fisheries industry, the Council reiterated the urgency of freeing the industry from exploitation by middlemen where such exploitation is known to exist, through the supervision of services by Governments, Cooperative Societies or Government-sponsored agencies where such services can be taken over from middlemen without impairing efficiency or increasing costs.

(6) The Council noted that the Factual Survey of Credit Facilities to Fishermen is not complete, since information has not yet been furnished by some Member Governments. The Council decided to complete this report and

requested the Member Governments to furnish the required information expeditiously. In order to extend the scope of the study, the Council further requested Member Governments to supply information on sources and terms of available non-governmental credit facilities. In this connection the Council requested FAO to make a suitable questionnaire available to Member Governments at an early date.

The Council expressed its interests in the Technical Meeting on Fishery Credit contemplated for 1960. Although a prospectus for the meeting is not yet available, the Council hoped that the meeting would give adequate attention to the problems of credit for the fisheries industry in the Indo-Pacific Region. In this connection the Council was of the opinion that a report resulting from its activities on compilation of factual information on fishery credit facilities in the Region would constitute a useful contribution to the Meeting.

5. FISH MARKETING

The Council noted that although recommendations were made at the 7th Session for a complete factual account of fish marketing conditions in the region, during the last inter-session period it was possible to collect information only on the role of governments in fish maketing. The Council further noted that the information made available to the Council in this respect was incomplete in so far as certain Member Governments were not able to furnish the information sought. In view of the incompleteness of the report, the Council was unable to draw any conclusions. However, it made the following preliminary observations :

(i) That under the situations that exist in the various member countries and in view of the inability of the Fishermen's Cooperative Societies to undertake fish marketing entirely on their own, varying degrees of Government participation in fish marketing is necessary at the present stage. Such participation should, however, be in the form of assistance and guidance to organizations sponsored by Governments, but enjoying satisfactory degree of autonomy and provide for, where ci stances permit, the eventual tion of such organizations cooperative basis.

(ii) No clear picture emerged as requirements of technically t personnel, the availability o personnel and the facilitie training.

(iii) The quality grading and c particularly for the export should be promoted whereve sible. The imposition of controls should, however, b ceded by adequate measur publicity and education and provide necessary inspectio analytical services.

The Council studied the first draft Bibliography on Marketing for the Indo- Region (Draft) compiled by FAO and exp its appreciation of the assistance given b in this connection. The Council suggeste the final version of the bibliography contain a subject index together with references to authors and that annotatio the references should be included, possible.

Having regard to the state o marketing in the Region and recognizi urgency for removal of the imbalance exists between production and consu of fish, the Council felt that a short Tr Center in which experienced fishery o directly connected with fish marketing member countries would participate, wil to define the defects in the industry, formulate measures for removal of such d In this connection, the Council requeste to organize such a Training Center as e possible, preferably not later than 196 requested the Member Governments to p pate in such a Training Center.

In preparation for this Center, the cil requested the Member Governme compile available detailed informatio supplement them where possible on the v aspects of the fish marketing industry, n distribution of fish by seasons and handling, transportation and storage fac wholesale and retail marketing faciliti organization, volume of trade in fish and

s, particularly the dried fish trade, for
arkets as well as export markets, price
ns and spreads at different stages of
g, availability of capital for the industry,
Government and private enterprise in
ustry, government program and policies
velopment to fish marketing, and their
with the policies for development of
spects of the fishery industry as well
r sectors of the national economy, and
lity of trained personnel for implemen-
arious development programs for fish
ng.

n this respect the Council also requested
o prepare suitable questionnaires and
te them to the Member Governments
advance of the scheduled date for the
r, so that participants could come
d with necessary information.

The Council directed the Marketing
mmittee to maintain close liaison with
the preparation of these questionnaires.

The Council recommended the following program in fish marketing for the next inter-session period :—

(1) completion of the survey of the role of the governments in fish marketing ;

(2) compilation of factual accounts of transportation facilities in fish marketing made available by Governments and private enterprise ;

(3) a survey of the requirements, in the light of the national programs and policies for the development of fish marketing, of trained personnel, the availability of such personnel and the facilities that exist in member countries for their training.

The Council requested FAO's assistance in the preparation of suitable questionnaires in connection with its programs of activities in fish marketing as mentioned above.

APPENDIX
REPORT OF TECHNICAL COMMITTEE II

INTRODUCTION

CRAFT AND GEAR:

1. Improvement of Craft:
   - 1.1 Design for fishing vessels
   - 1.2 Construction of fishing vessels
   - 1.3 Mechanized surf-landing craft
   - 1.4 Vocational training for boatbuilders
   - 1.5 Handbook on construction of small craft
   - 1.6 Appraisal of progress on surf-boat
   - 1.7 Meeting of FAO naval architects on surf-boat
2. Mechanization of Craft:
   - 2.1 Growth of mechanization
   - 2.2 Engines of mechanization
     - 2.21 Types of engines
     - 2.22 Make of engines
     - 2.23 Prices of engines
     - 2.24 Operation of engines
     - 2.25 Repair and maintenance
       - 2.251 Fishermen's ability to maintain engines
       - 2.252 Spare parts
       - 2.253 Workshop facilities
       - 2.254 Repair and maintenance expenses
     - 2.26 Effectiveness of mechanization:
       - 2.261 Extension of fishing grounds
       - 2.262 Extension of operating time
       - 2.263 Increase in handling of gear or in active fishing
       - 2.264 Economics of operation:
         - 2.2641 Increase in the catch
         - 2.2642 Improvement in the quality of the catch
         - 2.2643 Earnings of mechanized vessels
         - 2.2644 Earnings of fishermen on mechanized vessels
       - 2.265 Employment created by capital invested in mechanization
       - 2.266 Government assist mechanization
     - 2.27 Navigation and safety r ments for mechanized vessels
   - 2.3 Training of fishermen
3. Improvement and Preservation of Ge
   - 3.1 Improvement in design
   - 3.2 Improvements in material
   - 3.3 Improvements in construction
   - 3.4 Improvements in operation
     - 3.41 Mechanized handling of g
   - 3.5 Introduction of non-indigenous
   - 3.6 Symposium on fishing techniqu
   - 3.7 Preservation of gear
   - 3.8 Bibliography on Fishing Ge Methods
   - 3.9 International Fishing Gear Con
4. Availability and Exchange of W Information

FOOD TECHNOLOGY:

5. Fish Curing in Humid Tropics
   - 5.1 Research and investigations
   - 5.2 Application of research results
   - 5.3 Quality standard for cured fish
6. Fish Flour for human consumption
7. Use of Local Vegetable Oils for Can
8. Fish Products Manual
9. FAO Regional Training Center i Processing
10. TA Group Country Project in Fish C
11. FAO Regional Consultant in Fish Pro

FISHERIES ECONOMICS:
STATISTICS:

12. Australia:
    - 12.1 Pearling and Whaling
    - 12.2 Scale Fish, Shark, Mollus Crustacea
    - 12.3 Imports and Exports of Fish a Products
13. India:
    - 13.1 Number of Fishing Vessels Number of Fishermen
    - 13.2 Fishing Gear
    - 13.3 Cold Storage Facilities
    - 13.4 Processing Facilities

n :

3rd Fisheries Census

Survey on the Management of Fisheries cooperative

ippines :

Minimum Programme of Statistics

Raw material resource Survey

a :

General

Factual survey of Fishermen's cooperatives

Credit Facilities

Fishermen's Cooperative Societies in Madras

16.41 Assistance to the Societies

16.42 District Fishermen's Cooperative Federations

16.43 Housing for Fishermen

n :

Governmental Financial Assistance for Small Coastal Fishermen

ippines :

FAO Training Center in Fisheries Cooperatives and Administration

Functions of Middlemen and Cooperatives

18.3 Available Background Information on Fishery Cooperatives

18.4 Fishermen's Cooperative and Credit Facilities

19. Report on Government credit facilities for Fishing Industries in the Indo-Pacific Region :

19.1 Legislation

19.2 Extent and Form of the Funds

19.3 Purposes for Which Credit is Granted

19.31 Credit to Fishermen

19.32 Credit to Processors, Wholesalers and Retailers

19.33 Credit to Cooperative

19.4 Proportion of Total Funds required represented by the Loan

19.5 Interest Rates

19.6 Arrangements for Collateral and Requirements made of Beneficiaries

19.7 Repayment Procedure

Attachment I—Japanese Bibliography on Fish Flour for Human Consumption

Attachment II—Outine on Government Credit Facilities for Fishing Industries

REPORT OF TECHNICAL COMMITTEE II

(Period between the 7th and 8th Sessions of the Council)

INTRODUCTION

The Council at its 7th Session in Bandung, Indonesia, 13-27 May 1958, made several recommendations directed to its Member Governments and/or the Food and Agriculture Organization (FAO). These recommendations concerned improvement of conditions in the fields of fishing craft and gear, preservation and processing of fish, handing, transportation and marketing of fish, fisheries statistics and fisheries socio-economics.

Following the usual procedure, the Technical Committee II attempted during the inter-session period under review to promote activities in the member countries, in line with those Council recommendations directed to Member Governments. Recommendations directed to FAO were taken up with that Organization by the Council Secretariat.

This report is based on information made available to the Committee from time to time by its members on the results of their efforts and those of the governments and private parties in the member countries of the Council and on information supplied by the Council Secretariat on actions taken by FAO. It will be understood that the report as presented does not necessarily represent the complete picture of research and development activities that have taken place in the concerned fields in the member countries. Relevant information may also be found in the 'Report on the Status of the Industry', Working Paper No. IPFC/C58/WP8, also presented at the current Session of the Council. The Committee's report should therefore be read in conjunction with the latter report. Further, members on the Committee from several countries were not able to send information. Failure to send such information is not to be construed as an absence of activities in the concerned member countries. In certain cases, at least, the members on the Committee were over-worked and could not, in spite of best endeavours, manage to send information on activities which may have taken place.

In general, however, the Committee was relatively more active during the period under review than on previous occasions. This may, to a considerable extent, be a result of the services of Technical Secretaries made av by the Food and Agriculture Organizatio order to accelerate activities in the m countries, these Technical Secretaries en their efforts in establishing direct and frequent contact of Committee members the Council Secretariat and amongst them on the one hand and with fishery work their respective countries on the other They issued periodic circular letters t members of the Committee and its panels. letters reported actions taken by the C Secretariat and FAO in respect of the C recommendations and transmitted infor furnished by Committee members on taken in member countries. They also tained notes, as and where possible, on c research and development activities in areas relating to subjects of interest t Committee and its panels. These letters c appreciable response from the members.

Recorded below is the position as September 1958 in respect of the various mendations of the Council made at i Session.

CRAFT AND GEAR

(PANEL A)

1. Improvement of Craft

Activities in this field, as in others member countries varied within wide lir their extent and intensity, depending o national programs and policies fo development of fisheries as well as o general economy. While in some countr indigenous craft was not yet studied fr point of view of design, in others, im craft had already been designed, test commercially introduced.

In general, such improvements cor chiefly the small fishing craft (less than which constitute the great majority fishing fleet in the member countries. improvements were also primarily cor with making the craft suitable for mechan which was being very actively pursued i countries.

sign for fishing vessels

. multi-purpose fishing boat, 46 ft. in was designed in *Australia* on radical its distinguishing features in design exaggerated rake of stem, and (ii) hard hich disappears at a point approximately the o.a. length aft of the stem. The y of the vessel to this point is of steam ibers and normal round hull construction. vith the completed vessel have shown e chine construction provides for in- stability and the construction of the y eliminates the pounding which is y associated with a full chine hull in a a.

his vessel has been designed for par- g in: Danish seining, otter trawling, it, pole fishing, purse seining and g.

he use of such a vessel is expected to r continued production throughout the d for the taking, during seasonal abun- of different species of fish in a limited area, with the attendant economy of n and the advantage of fishing from ome port. The positioning of accom- n, engine room, live bait-rope wells, d, etc., was so arranged that with a of 25 tons of fish the extreme limits of terline provide for sufficient reserve y assuring safety in a seaway.

n *Ceylon*, some fishermen took to con- al western type small fishing boats. these were reconditioned naval craft; s a reconditioned Danish boat which had belonged to the Ceylon Department eries and was later sold to a fisherman, ther was a new 27 ft. boat built by a herman. Two more new fishing boats ilt according to designs prepared by a aval architect who is a resident in nd. These were constructed in the t's boatyard.

recently established boat building yard cording to its own design for a 26 ft. ilt 4 boats of local timber and laid hulls more. Each boat cost Rs. 11,600 com- ith a Lister LD 2 engine. This price ted a lower cost of production. Two ats had been in operation since April d were reported to have given good In addition, one Japanese and one Danish type vessel were under construction in two different yards.

One outrigger canoe was constructed with a specially wide hull, sufficient to take a 5-7 h.p. Coventry Victor marine Diesel engine, but in all other respects it was similar to the conventional outrigger canoe. This boat had already been commercially operated over a year with encouraging success and there were plans for constructing another boat with the same changes in design.

The local flat-bottomed canoe was adapted to mechanization by introducing a keel and a stern post. In view of the rounded lines of stern, a 4-ft. stern tube instead of the conventional 2-ft. one was used.

In *India* the commercial introduction of the improved 'Pablo' and 'Dan' boats as designed by FAO continued with progressively increasing speed. With the assistance of FAO experts, attempts continued for evolving further improvements in the design for these and other indigenous boats.

Such improved boats constructed, either at improvized boatyards of Fisheries Departments or at private boatyards were made available to fishermen by Union or States Governments on hire-purchase system. The boats ranged from 22 ft.-32 ft. in length, cost approximately 10-15 thousand Rupees each inclusive of engine and operated mainly gillnets or driftnets designed by an FAO expert.

The improvements of fishing craft in the maritime States of *India* were directed towards designing and construction of new types of fishing craft powered with Diesel engines and outboard motors. FAO Naval Architects and experts of the Indo-Norwegian Project were working in the development of new designs for mechanized fishing craft suitable for operation in the different coastal areas, viz. Bombay, Mysore, Kerala, Madras, Andhra and Orissa. A few boats incorporating certain improvements were constructed under the guidance of FAO Naval Architects and are proving satisfactory. The indigenous craft used by fishermen in Bombay area were found suitable for mechanization although some alterations in the lines of the existing fishing boats originally designed for sailing was deemed necessary. "Satpati" type of boats, the tank testing of which was done at the Central Water and Power

Research Station, revealed that rounding of stern-post and some improvements in lines was necessary to ensure the desired speed. These improvements are being incorporated in designs for new boats to ensure better performance.

Standardized designs of boats suitable for fishing in Saurashtra waters was prepared by an FAO Naval Architect. Same expert made a detailed study of the Tuticorin type of indigenous fishing boat in Madras State and recommended modified lines for this type of boats. The designs of fishing craft have not changed in Orissa. FAO experts have prepared designs of boats suitable for fishing in estuarine waters and inland reservoirs.

In Kerala, a new 25-ft. boat known as INP type which was designed by the Indo-Norwegian Project's Naval Architect will replace the 22-ft. boat earlier designed in the boat production programme. New and larger types are also being designed.

In the Madras State, a shore craft of essentially traditional designs called 'Pablo' was modified and adopted as a prototype boat. This boat is popular with commercial fishermen particularly for gill and drift-netting. Construction of 'Pablo' type boats was also initiated in Mysore State.

A new 25-ft. boat was constructed at the Indo-Norwegian Project in Kerala and minor improvements were effected based on trial fishing.

One of the most notable developments in India was the creation of the Central Fisheries Technological Research Station at Cochin. This station has a Craft and Gear Section. This Section will undertake research for developing improved types of fishing craft and gear. In respect of fishing craft, attention will be paid to hull design, engines for propulsion, navigation and fish-finding equipment as well as seamanship of the crew.

In 1957 this Section organized a center to train fisheries officers of the Maritime States in designing and construction of improved types of small mechanized fishing boats. This center was conducted under the supervision of Mr. Paul Zeiner, FAO/ETAP Naval Architect. Nine participants, most of whom were working as counterpart assistants to Mr. Zeiner, were deputed by the States of Bombay, Mysore, Kerala, Madras, Orissa and West Bengal. A similar training center was commenced i 1958. At this Center in addition to Mr. another FAO/ETAP Naval Architect, Mr Gurtner, also assisted.

It is claimed that the two center highly successful. The participants wh previously no knowledge of even drawing on completion of this center, not only draw but to design and to construct vessels according to line-plans.

In Japan, tank tests for towing carried out in regard to hydraulic resistan other physical factors of the hull of small boat (less than 5 tons). It is planned to the results of these tests to the FAO-spo Second International Fishing Boat Congre in Rome in April 1959.

Beams and compartment boards added to small craft built traditionally in with a flat keel. The deck was built to part of the boat. These improvements ga boats considerable seaworthiness.

The Netherlands New Guinea Fis Division commenced in July 1959 constr of a fishing vessel with an overall len 8.40 m. and beam of 2.30 m. The vessel constructed with local timber and w powered by a 10-15 h.p. Diesel engine. also carry sails. The vessel will be us experimental commercial fishing. Local men will be trained during the operations

Two boats, according to the d prepared by FAO experts, representing im ments in the 'Hora' fishing boat of Pakistan, were under construction at tagong, East Pakistan.

In Thailand, attempts were ma improve the designs of the indigenous craft with expert assistance under C Plan. One designer, one construction en and 3 expert carpenters were assigned to land by Japan under Colombo Plan. The prepared several designs of which two approved. Under supervision of the de the engineer and the three carpenter structed one gillnetter according to one designs and another boat according to the design was nearing completion. Both vessels were planned for trial operations next fishing season.

The Vietnam Fisheries Directorat an experimental small fishing boat

. The boat was also completely decked. s used by local fishermen have a round id are not decked. It was demonstrated experimental boat rolls much less than craft.

nor changes in the structure were also d in certain cases. In Hong Kong, the onal "A" bracket to support the long n of the propeller shaft was eliminated. sels were built with steel rudder stocks es instead of the cumbersome wooden ents previously employed. Some boats well constructed wheelhouses.

the Colony's Fisheries Division vessel o tapered wooden fillets were fitted on le of the keel. In addition, the edges ern chock were also rounded off, this elementary but important job which is ally done in the native junk building arefully conducted speed trials, both d after the introduction of these altera- re carried out.

struction of fishing vessels

e usual materials were used in the ion of the vessels. Ballast in the form te was used. Forward of amidships crete of coke-screenings was poured in m of the boat to provide a clean finish e bilge and maintain proper trim, the om being well forward.

ith the use of electrically operated aw, band saw, planer and drill, etc. at ae Marine Station, the Department of , Thailand, effected a 30% economy in r used for boat construction. At the tion a steam chamber was used for timber. In local boat building yards generally bent by heating over open by weighing the plank with heavy A similar steam chamber was also and successfully used in Hong Kong.

India, some government-sponsored also demonstrated economy in timber power tools. The indigenous boat ndustries in these countries, however, yet introduced such mechanization for mber.

e of cheaper wood like Ainee *(Arto- rsuta)* and Bin teak *(Lagerstoemia)* was being adopted to lower the cost of constructing fishing boats

In the construction of small fishing craft in Japan, greater attention was paid in the selection of timber and the use of galvanized tacks and bolts.

In Malaya, power tools were used in the construction of fishing boats with consequent saving in labour cost but no appreciable saving in timber.

1.3 Mechanized 'surf-landing' craft

A symposium entitled "The Boat and the Beach" was held at Quilon, India, between 3-8 March 1958. Organized jointly by the Government of India and the Indo-Norwegian Project, Quilon, India, the Symposium attempted to assess the progress so far made in India in the development of a surf-landing craft and to consider further measures that would be necessary in this respect.

The Symposium agreed that further work was necessary for evolving a satisfactory surf boat. It was also agreed that the general economics of mechanized beach-landing fishing craft with regard to hull, engine, maintenance, and expected earnings should be looked into.

The assistance of the Central Water and Power Research Station was requested in conducting tests with models of surf boats already designed and in conducting a survey of the surf conditions on the Indian Coasts.

A Summary Report on the Symposium is presented at the Current Session of the Council as a Working Paper (IPFC/C58/WP5).

Construction of a 24-ft. surf-landing boat designed by FAO was due to be completed in Ceylon by the end of September 1958. The original plans called for an off-centre installation of the engine. During construction it was found that such installation would have created several problems in the operation of the vessel and it was decided to install the engine in the centre line. Trials with this vessel were expected to commence in October 1858.

A Japanese boat building expert, employed by a Philippine Fishing Company, has been constructing boats which are suited for beach landing. The propeller shaft can be raised when necessary.

1.4 Vocational training for boat-builders

The Central Fisheries Technological Research Station, Cochin, India, organised two

training courses for States fishery officials in the designing and construction of fishing vessels (see p. 3, para 2-3). The officials so trained may in turn train boatbuilders.

In Japan, technical courses were held three times a year, lasting ten days each time. The courses were held each time at a different fishing center. General expenses of these courses were borne by the Central Government. In addition, shipyards building fishing boats accepted apprentices for training in boatbuilding.

Under a recently started scheme in Malaya, 15 boys with no previous experience were taken for training in boatbuilding.

Experts assigned to Thailand by Japan under Colombo Plan were training the boatbuilders employed by the Department of Fisheries, Thailand and stationed at its Marine Research Station at Ban Pae.

1.5 Hand book on the techniques of constructing small fishing boats

No information available.

1.6 Appraisal by FAO of progress in the development of surf-landing craft

No appraisal yet prepared.

1.7 Meeting of FAO Naval Architect surf-landing craft

A part of the request was met symposium entitled 'The Boat and the held in India (see IPFC/C58/WP5 prese the current session of the Council).

2. Mechanization of craft

2.1 Growth of mechanization

The growth of mechanization is sh Table I. In a majority of the member co mechanization proceeded with satisfactory Countries with rapid growth of mechan had well coordinated plans involving m tions in the designs and construction indigenous craft to make them suita mechanization; training of fishermen operation and maintenance of mechanize and in the handling of improved gea availability of mechanized craft to the fishermen on hire purchase system. In s these countries, fishermen themselve enterprising.

TABLE I. Growth of Mechanization

Country	Size of mechanized fleet in number of vessels		Rate of
	Year: 1956	1957	(%
Australia	—	—	—
Burma	—	—	—
Cambodia	—	—	—
Ceylon	—	74	—
French Territories (New Caledonia)	—	25	4.0
India	—	1,200	10.8
Indonesia	—	1,263	12.5
Japan	123,318 *	128,023	4.0
Korea	—	—	—
Malaya	5,641	6,283	11.4
Netherlands New Guinea	—	40	—
Pakistan	—	—	—
Thailand	1,032	1,531	40.3
U.K.: Hong Kong	1,475	2,173	47.4
Singapore	—	644	12.4
USA: Hawaii	—	—	—
Other territories	—	—	—
Vietnam	—	200	30.0

— Information not received by the Committee

* Small craft (less than 5 tons) only

ıe entire fishing fleet in *French New* consisting of 20-30 vessels is mecha- The sail for the fishing cutters, even xilliary means of propulsion has been d.

ıe slow development of mechanization nember countries was a result of several notable among them were: lack of ed plans; absence of vessels suitable anization; and in some cases lack of xchange for importation of engines.

a majority of the member countries anized boats were gill-or drift-netters. n countries, notably Hong Kong, Malaya iland, such boats also operated trawls, nes and traps.

Malaya, Philippines and Thailand, zed boats were employed for towing nized boats to and from fishing grounds.

Ceylon, outboard motors were used in hanization of outrigger canoes of both and planked construction. The high rd of the canoes made it necessary to tors with extended shafts. The experi- mechanize 'catamarans' (log rafts) with engines were also successful to a extent and 4 engines had been sold to n through Government.

Japan, 1957 statistics recorded 403,023 gistered as fishing craft. Of these 39% wered. Powered small craft below 5 nbered 128,295 or 83% of total powered leet. However, they formed only 17% gross tonnage of the powered fishing

he strength of the powered small craft d from 123,318 vessels at the end of 128,295 by the end 1957 representing an of 7,999 in gross tonnage and 4,977 in wer.

gines for mechanization

pes of engines

nboard petrol, Diesel and semi-Diesel as well as outboard engines were d for mechanization of fishing vessels. boats powered by steam engine num- nly 40 in Japan, perhaps the only country egion using this type of power. The najority of the engines were inboard of 10-15 h.p.

There were 77,607 small craft (below 5 tons) in *Japan* with electric ignition engines. Hot bulb engines were mostly used in this country on craft belonging to the 5-50 tons class which represented 28% of the powered fleet. Diesel engines were installed in 21% of powered fleet. In the *Philippines*, petrol engines, varying from low to as much as 60 h.p., were commonly used for 'banca' (dug-out) fishing vessels. Outboard motors formed a good share of mechanization of small 'bancas', especially after liberation.

Outboard motors were in general used when the vessel was not suitable for mechanization with inboard engine and when fishing trips were of short duration not exceeding a few hours.

2.22 Makes of engines

As many as 48 (perhaps, more) different makes of inboard engines and 10 of outboard engines were in use in the region. In the colony of Singapore alone there were inboard engines of 28 different makes and outboard engines of 9 (see Table II).

TABLE II. Makes of engines used in mechanization of fishing craft

	Number of different makes	
	Outboard	Inboard
Australia	—	—
Burma	—	—
Cambodia	—	—
Ceylon	2	7
French Territories	—	—
India	—	—
Indonesia	—	9
Japan	—	—
Korea	—	—
Malaya	5	14
Netherlands New Guinea	—	—
Pakistan	2	—
Philippines	—	—
Thailand	—	—
U.K.: Hong Kong	—	—
Singapore	9	28
USA: Hawaii	—	—
Other Territories	—	—
Vietnam	—	—

— Information not received by the Committee.

Japan used engines manufactured in the country. *India* had just produced a marine Diesel engine which was being tried. All other countries imported their requirements of engines.

Choice of an engine did not depend on its performance; the primary considerations being availability, price, previous experience with any particular engine in a country and the country's import-export trade relations. Availability of spare parts, repair and maintenance services was secondary in the selection of engines, particularly in the countries where mechanization of fishing craft was of recent introduction and where aid-giving agencies supplied such engines.

Appreciable interest was shown in Ceylon in air-cooled engines.

2.23 Prices of engines

Prices for the same engine in different countries varied within appreciable limits. A 4-h.p. outboard engine cost from about US $ 175 in *Malaya* to over 300 in *Ceylon* while a 10-h.p. inboard Diesel engine cost from about 1,000 in *Malaya* to 1,350 in the *Philippines*. Compared to the income of the fishermen, the prices for engines were in general high except in countries where no or very low import duty existed e.g. *Hong Kong*, *Singapore*. In countries with satisfactory foreign exchange situation, prices were markedly lower than in those with foreign exchange difficulties.

In some of the countries where fishermen experienced difficulties in procuring engines, relief was either given or contemplated by lowering import duty, or with partial subsidy by Government or by providing for hire-purchase by the fishermen.

2.24 Operation of engines

Fishermen, in general, learnt quickly to operate engines with which they might not have been familiar before. In a majority of cases, they were assisted by government-sponsored programs of demonstration, or well organized courses of training.

2.25 Repair and maintenance

2.251 Fishermen's ability to maintain engines

In countries where mechanization was of recent introduction, fishermen were gradually learning to look after minor repairs. This development in certain cases (India) was a result of government-sponsored training programs.

2.252 Spare parts

In countries where mechanization recent introduction, particularly in tho foreign exchange difficulties, spare par restricted in their availability. Impor such cases used almost the entire alloc foreign exchange in importing engi little, if any, of spare parts. The quantities of spare parts in these cas available only in the big cities. In c break-downs, fishermen from outlying from where the great majority of the fis operate, were obliged to make costly the cities.

The *Singapore* Fisheries Division's Unit sold spare parts at wholesale pr fishermen in out-lying areas thus savin the expenses for trips to the city.

2.253 Workshop facilities

Existing workshop facilities, part in those with mechanization recently intr were overloaded with the normal rep maintenance of engines installed in craft, merchant marine and lane vehicles

In some countries (Ceylon, India nesia, Pakistan) government-sponsored shops, especially for marine engines i in fishing fleet, were either already esta (Ceylon) or were underway (India, In and Pakistan). These workshops were, h centralized while the fishing bases are s over long coasts.

2.254 Repair and maintenance expenses

Accurate records were not in gene in a majority of cases; most of the info supplied was based on mere guesses. In where the records were relatively accur annual repair and maintenance expense roughly 10% of the initial cost of the e In the Philippines such expenses ran a for new engines and about 30% for su second-hand engines. Indonesia reporte expenses to have run as high as 20-25%.

These high expenses were attribu lack of adequate experience of fisherme handling of marine engines, restricted bility of spare parts, and high cost o services.

No information was available on or not failure to obtain prompt repair resulted in loss of fishing time.

ctiveness of mechanization

ension of fishing grounds

India the majority of the mechanized e extended their field of operation he fishing grounds usually exploited echanized boats. In case of drift-net e mechanized boats go as far as 50 the coast whereas the non-mechanized dly go beyond 20 miles.

Japan, *Indonesia*, *Malaya*, *Philippines* *apore*, mechanized craft operated 10 - 50 rther out into the sea than the non-ed craft. In Thailand, mechanized and anized gillnetters operated on the unds within 10 - 20 miles from shore rse seine fishery which lies further into vas exploited only by powered vessels. *hilippines*, the introduction of powered oats made it possible for non-mechanized fish in waters which they had not been xploit before.

tension of operating time

e mechanized craft became relatively lent of moderate weather conditions but ugh or monsoonic weather. In *Ceylon*, ered vessels operated for a higher of days in a year than sailing vessels uring certain periods were obliged to lie ue to failing wind. Where the fishery *ya* was independent of tidal currents, vessels operated for 180 - 220 days a against 150 - 180 days by non-powered In the rest of the member countries Indonesia, mechanized and non-zed vessels operated for about the same of days in a year. In *Indonesia*, due to complications in the preparations for trips, the mechanized 'mayang' for about 240 days a year as against by its non-mechanized counterpart.

In India, mechanized craft can fish for 22 ys in a month whereas non-mechanized erate for 16 to 18 days in a month. The ized craft fish for nearly 70% of the time rom port against nearly 40% for non-ized craft. This, however, depends pon the type of fishing. In Orissa, the average fishing for mechanized craft are 8 to 10 against 4 to 6 by non-mechanized craft.

In general, small mechanized vessels (less than 5 tons), operating gillnets, driftnets, or traps, made only overnight trips. In Japan and Thailand, however, such trips lasted one to three days depending on seasons and the distances of the grounds from the home ports. Large vessels *(Japan* and *Philippines)* made trips extending from a week to over two months. In the *Philippines* such vessels operating in distant grounds returned to their home port after 15 - 45 days depending on the distance of the grounds and the time taken to fill the holds. In ring-net fishing in the Philippines, mechanized units returned home after 5 days actual fishing to dry, tan and mend their cotton nets.

2.263 **Increase in handling of gear or in active fishing**

In *Singapore*, mechanized drift-netters operated longer nets than did the non-mechanized craft. In other countries, small mechanized gill-and/or drift-netters, operating on same grounds as non-mechanized craft and making only overnight trips did not, in general, engage the time saved in trips to and from ground, in operating additional quantities of gear. Instead, they stayed longer at port. In other cases such vessels making trips to distant grounds along shore or out to the sea, the time spent in actual fishing was practically the same as for the non-mechanized vessel, since a greater proportion of the time away from port was spent in covering distances. Powered trawlers, purse seiners and ring netters operating in near areas made more hauls, drags or sets than their non-powered counterparts operating on the same grounds.

2.264 **Economics of operation**

In Japan, a survey of the economics of operations by various types and sizes of fishing craft was conducted in 1956. The survey was based on 125 non-powered boats sampled at the rate of 1:900 and 135 powered boats (each less than 5 tons) sampled at the rate of 1:450. The data obtained are recorded in Table III.

TABLE III. Operation economics of mechanized and non-mechanized craft in Japan

Item	Non-mechanized craft	Mechanize craft
1. Number of fishing trips	144.5	191.6
2. Number of fishermen	440.3	732.4
3. Total fishing time (hr.)	2,424.0	4,868.0
4. Gross earnings (yen)	178,114.0	447,877.0
5. Capital investment (yen)	149,429.0	380,941.0
6. Operating expenses (yen)	115,850.0	222,093.0
7. Estimated wages of family workers (yen)	87,165.0	155,157.0
8. Net Income (yen)	28,685.0	66,936.0

In respect of other member countries, data were not available for comparing the cost of operation and consequently, the cost of production of fish by mechanized and non-mechanized craft. Such data would help in determining whether or not non-mechanized craft should be left undisturbed to operate in inshore waters, or they should be subjected to a stiff struggle for existence in competition with powered craft or whether powered craft should operate only in waters which cannot be exploited by non-mechanized craft.

2.2641 Increase in the catch

It was reported that mechanized craft landed 2-3 times as much fish as did its non-mechanized counterpart. Such increased quantities were not a result of powered propulsion of the vessel alone. It is difficult to estimate to what extent these increases were due to power, and to improved, enlarged and/or increased gear. In several cases mechanized craft operated gear made of synthetic fibers. As already indicated, mechanized drift-netters in Singapore operated longer nets.

2.2622 Improvement in the quality of catch

Where comparable e.g. operating on same grounds, using similar gear, and the same time of absence from port and the catch handled on board the same way, the quality of fish landed by mechanized and non-mechanized craft did not vary significantly.

2.2643 Earnings of mechanized vessels

According to limited information available, the gross earnings of mechanized craft were 3-4 times that of a comparable non-mechanized craft while the net earnings of the former varied from 1½-2 times that of the latter.

2.2644 Earnings of fishermen on mecha vessels

In certain cases, fishermen were e on fixed wages (Singapore, Philippines figures were available on wages of the the two classes of vessels. Where fish operated on share basis and where son were available, the indications were th average income of a fisherman on a mech craft ranged from 2-3 times that of a fish on a comparable non-mechanized craft.

2.265 Employment created by capital in in mechanization

Except for some preliminary indic no information was available in the m countries on the relative efficiency of invested in mechanized and non-mech craft, in the creation of employment. In a 25-ft. mechanized gill or drift-netter cos Rs. 12,000 to build and equip and anoth 3,000 a year to operate. A non-mechanize of the same type and size cost Rs. 3,000 t and equip and another Rs. 500 a year to o The mechanized boat was operated by a c four and the non-mechanized boat by one

It will be seen from these figur capital invested in non-mechanized cra vided employment for over four times a as when invested in mechanized craft. ever, these figures from India, where mech tion of fishing craft is in its early stage strictly preliminary.

2.266 Government assistance in mechan

Extensive assistance was given by M Governments to the mechanization of craft in their respective countries. Su sistance ranged from a coordinated p covering various aspects and phases of m zation, to mere technical advice. A su of measures taken in the member coun recorded in Table IV.

TABLE IV. Government assistance in mechanization of fishing craft

Country	Nature of assistance
n Territories	—
	—
	—
	i) Reduction in import duty for engines to 2.5% (preferential) and 17.5%. from 12.5% and 27.5%. ii) Hire purchase facilities; 33% down, rest payable in 24 equal monthly instalments. iii) Loan up to Rs. 15,000 with purchased equipment as security, payable in 5 years.
erritories	—
	Government subsidy of 25% on boats and 33.3 to 50% on engines. Loans also advanced to fishermen directly or through cooperatives. In addition, coordinated project providing for (i) construction of vessels according to designs prepared by FAO experts, (ii) equipping these vessels with engine and gear, (iii) training of fishermen under supervision of FAO experts in the handling of craft, engine, gear, as well as the catch, and (iv) making these vessels available to trained fishermen on hire-purchase basis. Six such training centers were at the time of reporting operating in India.
a	Rp. 10 million allocated annually for construction of mechanized fishing vessels which are given to fishermen through co-operative societies on hire purchase basis. Subsidy by Central and/or Prefectural Governments for auxilliary equipment e.g. fish finder, wireless apparatus etc. Adequacy of credit facilities for fishermen from banks or private funds, no longer makes elaborate government financial assistance necessary.
	—
	Low interest loans made through cooperative societies; one-third of these loans are written off, if repaid within three years.
nds Territories	—
	Marine engines received as aid under ICA of the United States of America given to fishermen on hire-purchase basis.
es	Under reparations agreement with Japanese fishermen allowed to purchase from that country large size mechanized boats on instalment payment in 20 years.

TABLE IV *(continued)*

Country	Nature of assistance
Thailand	Initial 25% down payment made by Gove directly to private firms which, by agreement engines to government-approved fishermen o purchase basis. The deposit by the Gove refundable by the firms within six months.
U.K. (Hong Kong)	–
(Singapore)	Loans.
U.S.A.	–
Vietnam	US$ 350,000 received as aid under ICA of the States of America spent in assisting fishermen procurement of engines and gear.

– Information not received by the Committee.

2.27 Navigation and safety requirements for mechanized fishing boats

Reports were received from certain countries (India and Thailand) of difficulties arising out of the rigid application of Rules and Regulations concerning navigation and safety to mechanized fishing vessels.

In recent years, there was a tendency to apply these rules to the latter and to refuse a consideration of the special circumstances arising out of mechanization of fishing craft. Fishing craft were treated on practically the same footing as merchant ships. Certain constructional requirements for the fishing vessels e.g. complete decking, wheelhouse etc. were insisted upon. Fishing personnel were required to have certificates, yet there were no well defined standards for examination, nor were there properly set up institutions where studies could be made for such certificates; safety rules were also required to be observed rigorously without any consideration to practical possibilities.

Sailing boats of similar designs and sizes have sailed the seas for centuries and even today navigation rules in respect of these vessels are very liberal indeed. Yet, as soon as an engine was installed, the same craft was required to carry a multitude of appliances which in most cases the crew cannot use.

These Rules and Regulations adh in the concerned countries, appear t been compiled from By-laws in force beginning of the century in some of the W countries. Those pertaining to small were probably meant for motorcraft ply big ports. These could not possibly hav meant for mechanized fishing craft whic non-existent in the concerned countries time the navigation rules and regulation compiled. These rules were, in all like meant to apply in their broadest sense a common sense view of the local cond craft, trade and hazards.

2.3 Training for Fishermen

In *Burma*, a center was establis Mergui for training local fishermen in with mechanized craft. A local boat, long, 13 ft. wide and 3 ft. draft, was con to a trawler for the training open Another boat, much smaller was mech for training in longlining. A fishery was sent to Canada for training. On to Burma, this official is expected to fishermen. The Burmese Governmen requested a 50-ft. combination purse and longliner, and a 60-ft. trawler from C Plan. It is planned to use these vessels received, for training purposes.

In Ceylon, 4 education centers w operation where fishermen were taugh

of fishing. There were six boats to these centers and fishermen were nder supervision of FAO and Colombo erts, to operate drift net, longline and ne. Demonstrations on the use of ar were also given on the Fisheries nt exploratory and training vessels, and *North Star* as well as on fishermen's s.

training course, lasting 3 weeks, in ation and maintenance of outboard nd marine Diesel engines had been d and a second course was underway.

ith fellowships awarded by the Govern- Japan under Colombo Plan, 12 local were to be sent on a course of in modern small boat fishing operations . Selections were made from active who had had sufficient educational nd to benefit from such an overseas

ith assistance from FAO the Govern- *India* organized during 1955-57 four or training fishermen in navigation, of mechanized fishing boats, modern equipment. During 1958, two more centers were established.

far, 240 fishermen had already recei- ing and about 120 more were under at the time of reporting. On completion month training course, the illiterate were able to use compasses, dividers rts effectively and to operate small fishing vessels equipped with gurdies nets. They were also able to maintain and make up and repair nets.

uring the training, the participants an allowance of Rs. 50 each per month ompletion of the training, small mecha- oats (25 ft.) were given, through a ive society, one to a team of four of the ishermen, on hire-purchase basis.

is reported that fishermen so trained after deducting a substantial part of ch to pay for the boat, gear and equip- an instalment system and for operational s, 2-3 times as much as their fellow n who still used traditional 'catamarans', nd local types of gear.

ounterpart assistants to the FAO experts for the first two centers were trained to take over new centers as they opened. These assistants who were biologists and had little knowledge of fishing, very quickly learnt to operate the training program.

In *Indonesia*, the Sea Fisheries Service in cooperation with the Navigation Service organized during 1957 a series of three courses for training fishermen in navigation and in the operation of mechanized fishing craft and gear. Each course lasted three months, the participants in 1957 numbered 80. In past years several hundred participants had completed these courses successfully.

The training in navigation had three phases: (i) local navigation, (ii) inter-island navigation, and (iii) navigation out to 60 miles into the sea.

The training in operation and maintenance of engines had two phases: (i) elementary course in operation (drivers), and (ii) intermediate course in maintenance (mechanics).

In addition, a school of middle standard which imparts special training in fisheries, particularly to children from fishing communities, has been in operation at Tegal for several years. The children at this school learn, in addition to languages, arithmetic, etc., elementary fisheries biology, navigation, operation and maintenance of craft and engine, making and maintenance of gear, handling and preservation of fish and other subjects necessary for professional fishermen. In addition, a school of the same type was opened at Ambon two years ago and another at Medan in 1958.

In *Japan*, training for fishermen was arranged by fishermen's cooperatives with government assistance, where necessary. In cases of advanced training courses, the cooperatives arranged for State examinations to be held for those who wished to obtain licenses.

In *Malaya*, the Fisheries Department ran courses lasting three months during which fishermen were trained as helmsmen and engine drivers and became competent to maintain and repair engines. No training in the handling of gear had so far been given in Malaya.

In the *Netherlands New Guinea*, the fishermen were taken on board the Fisheries Division's cutter and two motor boats for training in navigation, and handling of engines and gear. In addition, there is a school in

Hollandia for navigation where along with others, fishermen may receive training.

Training for *Philippines* fishermen was provided in fisheries school, both public and private. There are several fishery schools of secondary level established in some provinces of the country.

Two courses of training for fishermen were organized in *Thailand* jointly by the Fisheries Department and Fish Marketing Organization. The Navy, the Customs and the Harbor Department also assisted. During each course, the 35 participants were taught navigation, safety at sea and handling of marine engines. On successful completion of the training the participants received certificates of competency as navigators (fishing boat) issued by the Harbor Department.

In *Hong Kong*, the Fisheries Division ran regular classes for training of fishermen as skippers, coxswains, and engineers. On completion of training, the participants sat for examinations and if successful, received appropriate certificates issued by the Marine Department.

In *Singapore*, young fishermen aged 18-20 years received training in deep-sea fishing on board a Japanese fishing vessel belonging to a local firm. The trainees were under contract with the firm for three years during which time it was hoped, they will have gained sufficient experience in deep-sea fishing. During the training period, the participants received a monthly wage of St. $ 60, an extra allowance of $ 12 and free meals.

The Fisheries Division's Mobile Unit gave instructions and demonstrations to fishermen in the repair and maintenance of engines installed in their boats.

Recently, a comprehensive training scheme with head-quarters at Tg. Kling was commenced. The subjects taught include elementary fisheries biology, fish culture, operation of fishing craft and engines, navigation and safety at sea, making up and maintenance of gear, and preservation and processing of fish.

3. Improvement and Preservation of Gear

3.1 Improvements in design

In *Japan*, a new type of kite for otter trawls was developed. In trawling operations conducted during December 1957 to Apri it was confirmed that the net aided with t could open its mouth as much as 4 me height, resulting in about 30% increase in catch over another operated without th which could not open its mouth to more 1.5-2 m. resulting in failure to catch some demersal fish, particularly prawn that swim about in layers a little above the bo

A description of the kite and res experiments with it, were first described FAO International Fishing Gear Congres in Hamburg in October 1957. A paper ha been published and the full reference is:

Takayama, S. and T. Koyama (
Studies on trawl net-
net-mouth stretcher work
kite principle. *Bull.*

Tokai Reg. Fish. Res.
No. *19*, 1-26 pp. (Se
IPFC/C58/TECH 8).

An otter trawl designed along th of a native-type pair trawl but with wings was constructed by the Hong Fisheries Division. This net was o during April-June 1957. Various combi of sweep wire length, type of ground number of floats etc. were tried. The eff of this net was compared with that already-proven small Australian type otter trawl which was operated simultan on the same fishing grounds.

3.2 Improvements in Materials

Synthetic fibers for net making co to gain in popularity. In Japan, synthet replaced cotton by 75%. After demons of its superior catching power, longer li no need for preservation, the demand fo became much more in certain countries (India, and Pakistan) than could be met.

In *Ceylon*, a fair quantity of w twine and fishing line made of Kuralon, thetic fiber cheaper than but equally effic nylon, was imported by the trade, chiefl Japan. In the same country artificial uni used for longlines.

In *India*, the high price for nylon is beyond the reach of average fisherm proved a strong deterrent to the fiber's u acceptance. In Bombay, the use of n

ted to drift nets. Its use in 'dol' or s which is still the main gear in Bombay not possible owing to large investment for these nets.

s the fishermen do not have enough invest in the synthetic fiber, the State ments formulated schemes to make this material to fishermen on subsidized

Korea, Kuralon nets have since 1957 cotton nets on the one-vessel purse The catches have increased and Kura- have been found superior to and more cal than cotton nets.

India, a plastic-rubber float for gill-and was designed, tested and commercially by a private firm in Bombay. In the untry, the government-sponsored train- ters introduced cement weights of designs and shapes for bottom-set

xcept for *Japan*, all other countries nported their supply of nylon or received gh aid-giving agencies (Ceylon, India,). Due to foreign exchange difficulties, untries (Ceylon, India, Pakistan) could ort adequate quantities of nylon to meet demands. National programs and for general economic development and ign exchange situation in certain coun- ght not permit regular and adequate ion of the fiber, at least for some years. produced cotton twines for net making owever, in plentiful supply in these s.

here were no reports of any contemplated these countries to manufacture nylon naking.

ue to the high investments required in ts, fishermen in a majority of the coun- perienced difficulties in procuring nets f this fiber. Assistance was given by ents or private agencies with credit , India) and/or facilities for hire-purchase n).

.3 Improvements in construction

knotless net, made of rot-proof synthe- s, became popular, according to a paper ed at the FAO International Fishing ngress, Hamburg, October 1957, by a of the Japanese delegation.

The net was made by a process in which several single yarns were doubled together with a twist by a machine. Two or more of these doubled yarns were again doubled and twisted into a strand in 'Z' direction. This strand was then wound on the bobbin of the net-making machine. Twines in the knot-less net had an 'S' twist of two-ply strands.

Special features of the knotless net were claimed to include: lighter weight and less bulk since as much as 50% of the raw material could be saved; higher strength; less resistance to currents; ease of handling; no friction; less labour and smaller tackles; no more damage to fish; almost 100% exact mesh size; easier and complete dyeing; and less adherence to dirt and microbes.

By a heat-setting process, the 'S' twist in the twine was fixed in position and the twine became stronger by about 15%. Also, hard fibers became soft and soft fibers could be given suitable hardness.

Through the six fisheries training centers in India, attempts were made to introduce improved knots in nets and proper hanging of the webbing on the headrope.

Imported with the assistance of the United Nations Korean Reconstruction Agency (UNKRA), 36 net-making machines and 10 winders were in operation in Korea. This mechanization considerably reduced the acute shortage of nets first caused by extensive war damage suffered by Korean ports and further aggravated in the last few years as the fishing fleet was restored and expanded by UNKRA's program of aid for the fishing industry.

The East Pakistan Directorate of Fisheries recently imported one net-making machine in addition to the one which had been operating for the past several years.

3.4 Improvements in operation

Use of swivels in the *Indonesia* 'Pontjing prawe', a small longline, was claimed to have resulted in increased catches. Use of light in the operation of "Banrong", an Indonesian lift-net, resulted in increased catches in the Makassar region.

In Korea, until 1955, the mackerel fishery had been exploited by two-boat purse-seiners; each one weighed 20 to 40 tons but recently

in line with the policy of increasing catches of mackerels, the one-boat purse seiners have been built.

These boats are bigger than those which operate as purse seiners and are fitted with modern equipment, such as fish finder, direction finder, power block and winch; the speed is 10 knots, 3 knots more than the old fashioned boats. With the new vessels, mackerel fishing can be carried out not only on the offshore waters, 20 to 30 miles, but also in the deep-sea waters, 100-150 miles. The number of the one-vessel seiners has been increasing from year to year. One-boat purse seiners have been found much cheaper to build and more economical to operate than two-boat units.

In Malaya, experiments in the dyeing of nylon nets were carried out using special chemicals and the results were applied to the nylon drift nets which the Fisheries Department employed in comparative fishing experiments.

The Hong Kong Division of Fisheries made experimental trawling over rough ground which local trawlers with their light gear were not able to fish.

3.41 Mechanized handling of gear

In India efforts were made to bring into use such mechanical devices as winches and gurdies in the operation of local nets. Demonstrations were given by experts on various occasions and during training of fishermen.

Mechanized handling of gear e.g. use of line haulers for tuna longline, net haulers for gill nets, drift nets, and purse seines, developed to a certain extent in Japan. Such mechanized handling increased the operation efficiency by three to four times more than in hand manipulation. Mechanized handling of some types of nets increased rather than decreased employment of man-power. Such increase was a result of the ability of a vessel to use far greater quantities of gear than were possible with hand manipulation. In coastal fisheries exploited with set nets and sardine purse seines, plans were under way for introducing mechanized handling of gear, primarily for reducing labour costs without, of course, increasing appreciably the quantities of gear operated.

Attempts for mechanizing the operation of the Malayan purse seine failed as the pursing could not be done quickly and the fish escaped. It was considered that the rather too powered boat employed in the operations in the wind and tide; this lifted the foot r the net and allowed the fish to escape.

Malaya expressed apprehension mechanized handling of gear might le unemployment.

In *Pakistan*, one drum winch was im and issued to a fishing boat for trials; the r were not yet available. A small trawl and a drum winch for trials were being or

Mechanized handling of otter traw highly developed in the Philippines, an man-power to operate the gear was substa reduced. In ring nets, the hauling o pursing line by a winch resulted in inc sizes for the net but no appreciable reduct man-power.

3.5 Introduction of non-indigenous

Attempts continued in several cou for the introduction of non-indigenous chiefly of Japanese origin. The various tried were: 'boke-ami', bottom-set gi Danish seine, floating longline, Lampara, ami', 'muro-ami', 'otoshi-ami', otter traw trawl, purse seine and tuna longline.

In *Burma*, operations of otter an trawls were continued with significant mercial success by the Martaban Comp joint Burmese and Japanese concern. In bay, India, a similar concern continued mercial pair trawling. Of particular signif was the fact that trawlers over 100 ft. operate during the monsoon while the local fishing fleet was laid off and that c were good.

In *Ceylon* floating longline, tuna lo and nylon gill and drift-nets were succe introduced.

Experimental purse-seining was conducted in Ceylon waters under the su sion of FAO experts with two purse seine also donated by FAO.

In *India*, significant results were ob with bottom-net gillnets. Trawling with craft (especially for shrimp) on the West showed excellent results. Two-boat seining for sardine and mackerel was als on the West coast.

Trammel nets were tried with the help of bo Plan fishing experts in Saurashtra and were found to offer no significant ages. In addition, in the maritime States mbay, Kerala, Madras and West Bengal, rawling, shrimp trawling, purse-seining, nized longlining etc. were being tried essels provided under the foreign aid.

The 'boke-ami', the lampara, the longline, ami' and 'otoshi-ami' were introduced in *sia*. The operation of the lampara along light had already established itself in the sar region and was spreading to others. nuro-ami' had almost become a domestic the Djakarta and Makassar regions and st spreading to others.

In *Malaya*, Danish seining was attempted 5 and 1956 off the coasts of Perak and A standard 'whiting net' with specially ed shoulders and wings was used to a fishing depth of not less than 15 ft. t was fished by the Scottish fly dragging l using three coils a side. The depth of ound varied from 10 - 16 fathoms. The consisting of *Leiognathus* sp, *Sciaena* sp., e sp., *Stromateous cinereus* and some , was not high enough to warrant com- l introduction of the gear.

Beam trawling for prawns was also com- l in Malaya. These trials were con-

Otter trawling had already become an hed industry in the *Philippines*. The mi' was being successfully operated by s. The present 'muro-ami' in Philippine is slightly improved over the Japanese originally introduced. This gear regular- led large catches. The 'otoshi-ami', a t and an improved version of the local rral', were under trial. There is a big y engaged in 'otoshi-ami' fishing. In n, introduction of other Japanese gear, a longline and purse-seine, was being ed by the Bureau of Fisheries.

The 'masu-ami' and 'otoshi-ami' whose ic operation had been successfully trated earlier by the Department of es, *Thailand*, found no application at all mercial fishery. Since 1956, Japanese wls were being successfully operated by e firm. Initial heavy investment in the d the craft as well as lack of experience in the handling of the gear, proved deterrents to its popular acceptance by the local fishermen.

Pair trawls were introduced in *Singapore* as joint projects with Japanese experts. Four pairs landed about 1,650 tons during 1957. The prospects for an expansion of this fishery appeared good.

In *Vietnam*, the 'boke-ami' and the 'otoshi-ami' were tried with the assistance of Japanese technicians. The 'boke-ami' did not prove satisfactory while the 'otoshi-ami' gave good results and trials with the latter were continued.

3.6 Symposium on Fishing Techniques

Sponsored by the Government of India, a symposium on 'Improved Types of Fishing from Small Mechanized Boats' was held at Cochin from 28-31 October 1958. The participants were officials of the Union and States Governments who are connected with the program for the development of fishing craft and gear, officials concerned with the six fishery training centers in India, experts of FAO, United States Operations Mission (T.C.M.) Colombo Plan, Indo-Norwegian Project who were on assignment in India in the field of fishing craft and gear, as well as representatives of the fisheries industry.

The Symposium was planned to assess the progress made in the improvement of fishing gear and their operation in India and to plan further measures in this respect.

The discussions during the Symposium were concentrated on: Materials for fishing gear; operation techniques of specific gear e.g. lines, gillnets, round haul nets, trawls and traps; mechanical and electronic fishing aids; relationship between craft and gear; and deck layout.

Practical demonstrations of the operations of longlines, gillnets, shrimp trawls and purse-seines were also planned.

As a part of the demonstrations, exhibits of the different gear, gear materials, deck and electronic equipment etc. were also to be arranged for inspection by the participants.

3.7 Preservation of gear

Preservation of cotton gear continued with 'catechu' extracts of mangrove and other barks as well as with coal tar. Chemical preservatives were used rarely, except in Japan.

Most countries produced their own requirement of bark. *Pakistan* imported catechu; *Japan* imported about 3,000 tons of catechu a year from Borneo. Coal tar was in many cases imported.

The nets were cold treated with 'catechu' and bark extracts while coal tar was applied hot.

Chemical preservatives were often employed in *Japan* along with some other substance which formed a film over the twine. The high prices of chemical preservatives did not make them sufficiently popular with fishermen.

Tests on the effectiveness of several methods for preserving fish net twines were carried out over several months at the Central Fisheries Technological Research Station, Cochin, *India*. The results indicated that preservatives used in combination with each other gave much better results than when used alone. For instance, twines treated with the extract of Indian 'panichikka' *(Diospyros embryopteris)* bark were rotten after 20 days of continuous immersion in warm backwaters, but such treated twines were subsequently dipped in coal tar, it was found that after 57 days of continuous immersion the twines still retained 74% of their original breaking strength. A fuller description of the experiments and the results is presented at the current session of the Council (See IPFC/C58/TECH 1).

Experiments on the preservation of coir ropes also commenced at the same Station.

An improved process for preserving Manila ropes was developed in *Japan*. The Manila fibers were dyed, in the early stages of rope manufacture, by a dipping system, mainly with copper napthenate compounds. The dyestuff was impregnated into the fibers more thoroughly and did not dissolve in sea water as easily as, when the finished rope was dyed in the usual way by compressor or vacuum system.

In Hong Kong, two nylon trawls were treated with phenolfree tar. This made the nets heavier with the result that they stayed on the bottom while being towed and at the same time successfully overcame the problem of mesh deformation previously caused by slipping of knots.

3.8 Bibliography on Fishing Gear and Methods

This Bibliography has been issued as Special Publication No. 4 of the Indo-Pacific Fisheries Council. It is multilithed a the same format as in the *FAO World F Abstracts*, so that, if need be, readers m the cards and file them.

3.9 International Fishing Gear Congres

The FAO International Fishing Congress was held in Hamburg betwee October, 1957. It was attended by ov participants from about 40 countries, inc fishing vessel owners, skippers, gear tec gists, biologists, fishery administrator manufacturers of fishing gear, auxiliary ment (winches, echo sounder and other ele fishing aids) and synthetic fibers.

Among the members of the Indo- Fisheries Council, Japan took a very acti having sent a large delegation and pre several of the 111 technical papers discu the Congress. The discussions conce on: Materials for gear; Rational desi construction of gear; Strategy and tac fishing; and Electrofishing.

The technical information resultin the Congress has been published in boo under the title *Modern Fishing Gear of the* The material was edited by FAO a publishers are J. Arthur Heighway Publi Ltd., Ludgate House, 110 Fleet Street, L E.C. 40.

4. Availability and Exchange of W Information

Most of the member countries hav ties for forecasting weather and for broad weather information. The frequency broadcasts varied from country to coun in any one particular country with seas weather conditions. In some countries information was broadcast regularly e along with newscast and more frequently rough season and, if need be, by special bu In others, weather forecasts were broadc in cases of approaching storms. In c storm alarms, hour to hour progress repo broadcast in *Japan*, In the same cou cases of emergency, fishermen's coo societies were directly informed over th by local weather stations.

Wireless receiving sets were general, available on board commercial vessels except in *Japan* where also sm

5 tons) did not carry such sets. In some es receiving sets were provided by go- nts at community centers, fish harbors and rkets. Research vessels in most coun- owever, carried these sets.

The weather forecast is announced over ean Broadcasting System. Information her conditions are obtained through the Meteorological observatory in Seoul collects the meteorological data from its l observatories situated at Kangnung, n, Seoul, Sosa, Chyuan, Inchon, Ulnung won, Chungju, Saisan, Chupoongrun Pohang, Taeku, Chunju, Kochang, Ulsan, Kwangju, Pusan, Mokpo, Yosu and Chaeju. Fishermen can get the weather information, for example temperature, rainfall, atmospheric pressure, two times a day.

Facilities did not exist for commercial fishing vessels, except for large Japanese vessels, to transmit to shore information on weather. Research vessels in certain cases carried radiotelephone transmission sets. It is not known, however, if such vessels had any arrangements for transmitting weather information to shore.

FOOD TECHNOLOGY
(PANEL B)

Curing in Humid Tropics

esearch was conducted at various labora- the region on the curing of fish and in dling and storage of cured fish. In the results of such research found little, application in the industry. The fish industry continued with its primitive ues and unhygienic practices and turned lucts of very low quality. The capacity ndustry also did not increase in keeping e increased production of fish resulting from progressive mechanization and ment of the fishing fleet.

search and investigations

he following publication appeared g results of investigations in fish n the *Ceylon:*

ara, C.; N. de Silva and A.W. Lantz (1956). Preservation of fish by salting and drying. *Ceylon Dept. Fish. Prog. Rep. Biol, Tech.*, No. 2: 44 - 47.

n order to develop a satisfactory com- curing process for dried salted fish nethods were investigated.

he most satisfactory results were l by a process involving the removal of l gills and the extraction of slime and dipping in a 10 per cent brine prior to in a salt solution maintained at satura- alt alone was found to be insufficient to bacterial decomposition. However, this trolled by the use of 2 per cent citric acid added to the brining solution. The growth of disease carrying bacteria was controlled in the product by this concentration of citric acid which also prevented the growth of many types of fungi. In addition, citric acid increased the initial rate of salt penetration thus shortening the time during which the fish is most liable to decompose.

The salt-citric acid protection permitted of slow air drying without deterioration; apart from its superiority to direct sun drying, the process was thus made independent of adverse weather conditions.

In addition, experiments on smoking, salting and drying of freshwater fish were undertaken at the Fisheries Department Laboratory. Of the various items produced, smoked Tilapia was well received by the Sinhalese, while salted and/or smoked *Labeo dussumeri* was favoured by the Muslims. The experiments were being continued.

In *India*, establishment of a Processing Wing attached to the recently established Central Fisheries Technological Research Station at Cochin was sanctioned to accelerate research on fish processing and utilization of fish products. It is also planned for the Wing to evolve quality standards for various fish and fish products. Expert assistance from FAO was due in 1958 for suggesting details of the personnel, equipment etc. for the Station and for training of personnel after they were recruited. The counterpart assistant for the expected FAO expert had already been recruited.

Research on fish curing in *India* continued at the various existing laboratories of the Union and States Governments. The following papers are among those which were published during the period under review:

(i) Krishna Pillai, V.; A.P. Valsan and M.R. Nayar (1956). Studies on the chemical quality or cured fish products from the west coast of India. Indian J. Fish., 3 (1): 43-58.

A survey of the major fish curing centers in the Travancore-Cochin and Bombay coasts was undertaken. Samples of salt and cured fish, representative of the different methods practised in the above areas, were collected and analysed for their chemical constituents. Samples were also collected from three important dry fish marketing centers in the country and analysed.

The data indicated wide differences in the quality of the cured products collected from the different localities. The analyses of the salt samples showed that in most cases the composition of salt used by the curers did not come within the tentative standards proposed for salt for fish curing purposes. The poor quality of the cured fish products could possibly be ascribed to the defects in the methods adopted in each area and to the low NaCl content of the salt or alternately to the high percentage of impurities in the salt.

(ii) Krishna Pillai, V.; A.P. Valsan and M.R. Nayar (1957). Studies on the curing and preservation of 'Choodai'-I. Some aspects of dry salting. *Indian J. Fish.*, 4 (1): 32-46.

Studies were conducted on different aspects of curing of sardines. Data were presented on the changes in the moisture and total volatile nitrogen (TVN) contents of the fish during drying in the sun for different periods under different experimental conditions. In sun-dried sardines the moisture content of the fish had to be kept below 25% in order for it to keep for a sufficiently long period without undergoing spoilage.

The rate of penetration of salt in the case of *S. gibbosa* and *S. albella* at different intervals during drysalting with different proportions of salt was studied. It was observed that, under normal conditions, optimum salt pene took place within 20 hours in the case former and 26 hours in the case of the when salt was used in the proportion of 1:6. With less salt, the period of salti found to increase. It was further observ the TVN values of those samples kept salt were comparatively high.

Where pressure was applied on while salting, the period required for o salt penetration was less. The water fr fish was squeezed out quickly when press applied and this probably helped in quic uniform curing.

The TVN and peroxide values stored samples were estimated at r intervals. The results indicated that sufficiently high proportion of salt up to weight of fresh fish was used, the incr the TVN values was comparatively small

(iii) Krishna Pillai, V. and M.R (1957). Determination o volatile nitrogen in cured f ducts. *Indian J. Fish.*, 295-303.

The values of total volatile nitroge obtained from three extracts of different of cured fish when distilled under unifo ditions in presence of sodium borate, po carbonate and sodium hydroxide, were co Experiments were carried out with a finding out the extent of variation in the of TVN with the increase in the conce of the fish muscle in each of the extr distilling with these alkalies. The re these experimental investigations poin that for TVN determination, it is prefe prepare an aqueous extract of the fish wherever possible and to use sodium b alkali. The advantage with alcohol however, was that the proteins were prec and a clear solution remained.

(iv) Krishna Pillai, V. (In Press). ments on the preservation by pickling. *Indian J. Fis*

(v) Suryanarayana Rao, S.V. Nayar and A.P. Valsan Tetrazolium reduction as a of spoilage in cured fish *Sci.*, 25: 396-97.

(vi) Suryanarayana Rao, S.V.; M.R. Nayar and A.P. Valsan (1958). Preliminary investigations on the pit curing of fish in India. *Indian J. Fish.*, 5 (1): 160-169.

A study of the process of pit curing of ch is practised mainly on the east coast Madras State was undertaken to deter- ne optimum conditions for the cure, quality of the cured products and to the different chemical tests for the n of spoilage during storage. Mackerel osen for the investigations which also l observations on the more common of wet salting. Pit curing improved the eptic properties by imparting a charac- flavour and softness to the flesh. How- eir appearance was rather unfavourable ir keeping quality limited to a few weeks ie cure. Wet salted mackerel on the and were found to keep in a good n up to 2 months.

The beneficial effect or maturation or under semi-anaerobic conditions in pit was reflected in the release of large of free amino acid nitrogen during . However, the levels of total Volatile n (TVN) which had also increased he curing period reached more than 500 noisture-salt-free basis) after two weeks ge. The optimum period for the cure nd to be two days in the case of gutted l salted in 1:5 ratio. A comparative f the changes in TVN Trimethylamine, Nitrogen and Peroxide Value during revealed the usefulness of TVN increase for the assessment of quality.

(vii) Venkataraman, R. (1956). Effect of aureomycin, nitrite and ricinoleate on red halophilic bacteria. *Curr. Sci., 25:* 190-

ultures of *Pseudomonas salinaria*, *Ps.* , *Bacterium trapanicum*, *B. halobiom*, *cus morrhuae*, *M. roseus halophilus*, *litoralis*, *S. morrhuae*, *Halobacterium* , *H. gibbonsii* (N. sp.), and other red ic bacteria were grown on salt-milk which known quantities of aureomycin, nitrite and sodium ricinoleate, were The final pH was adjusted to 7.5 ± 0.1. inoculation was made by streaking.

Except *H. gibbonsii*, none of the other red halophiles was affected by even 10 p.p.m. of aureomycin. Growth was profuse and rapid as in the control and no morphological changes were noticed either. It is surmised that the high magnesium content of the medium reverses the action of aureomycin. At 0.1% of $NaNO_2$ the cocci were not inhibited. At 0.5% some cocci still showed growth. But the rod forms failed to grow at 0.2% $NaNO_2$ concentration; with sodium ricinoleate at 0.2% level, only rod forms grew and all the cocci were suppressed. It is suggested that for salting hides a combination of 0.2% $NaNO_2$ and 0.2% sodium ricinoleate be used though this high concentration of nitrite is not recommended for curing fish.

In addition, experiments in pickling of mackerel with salt and ordinary tamarind *(Tamarindus indica)* indicated that this tamarind is a good substitute for *Garcinea cambogea* which is now employed for the commercial Colombo cure. In another experiment, it was observed that incorporation of 0.02% sodium nitrite by weight of fish in the salt while pickling, as also pretreatment of fish with certain other preservative chemicals, could considerably improve the keeping quality of the products. Attempts were also made to prepare pickled products e.g. Russian sardines and marinated herrings, the methods being modified to suit tropical conditions.

Usefulness of certain preservative chemicals in methods of curing other than pickling was also being tried. A few of the preservatives indicated significant results. Pretreatment of fish by a dip in citric acid solution improved the keeping quality of dry cured sardines and pretreatment with propionic acid solution, before salting, made both the dry-cured and wet-cured products resistant to the growth of molds and red halophilic bacteria.

Studies on the shelf-life of samples of dry-cured fish stored in different packing material and under different relative humidity conditions were attempted. Prelimimary experiments indicated that triphenyl tetrazolium bromide reduction test may prove to be useful in measuring the spoilage of cured products.

The laminated and deboned dried Bombay Duck product was found superior to the sun-dried variety as the former ensured complete

dehydration, thus facilitating storage over long periods. But, the process proved more expensive than the traditional sun-drying.

At the Model Fishing Community Development Centre at Kota Baru, *Indonesia*, an experimental mechanical dryer for cured fish was installed.

In *Japan*, Central Government Regional Fisheries Research Laboratories as well as non-governmental research institutions belonging to universities or commercial firms, continued research in fish curing. None of the projects, however, were specifically concerned with fish curing in humid tropics. However, the following publications are of general interest

Takei, M. and T. Takahashi (1956). On the preparation of reversibly dried fish meat. *Bull. Tokai Reg. Fish Res.Lab.*, No. *1* : 91-97.

Attempts were made to develop a process which would give dried fish meat reversibility, the property to restore the water content when immersed in water as nearly as possible to the level in fresh fish.

The dried meat containing only small quantities of fat absorbed much more water than those rich in fat.

When the dried meat had been treated, before drying, with either sodium citrate, or dibasic sodium phosphate or any of several antioxidants, e.g., butylated hydroyanisole (BHA), was immersed in water, the water absorbed was less than in raw meat.

On immersing dried meat, which prior to drying was treated for 15 hours, with 0.05% BHA solution containing 2% sodium citrate (or 1% dibasic sodium phosphate), it was observed in many cases that the water absorbed was greater than that in the raw meat.

Toyama, K. and K. Saruya (1955): Method for protection of marine products against deterioration due to oxidation of oil - IV. Application of some antioxidants to salting of salmon. *Bull. Japanese Soc. Sci. Fish.*, *21* (4) : 248-52.

.....; T. Tochi and K. Saruya (1956). Method for protection of marine products against deterioration due to oxidation of oil - V. Application of BHA to salting of salmon. *Ibid.*, *22* (3) : 198-201.

Ando, K. and K. Saruya (1956). for protection of marine p against deterioration due t tion of oil - VI. Applica BHA in dry-salting of *Ibid.*, *22* (3) : 202-205.

.....; N. Yamaguchi and K. (1956). Method for protec marine products against de tion due to oxidation of The protection of 'Aram BHT. *Ibid.*, *22* (6) : 383-385

Experiments were conducted with antioxidants incorporated in the salt e for curing (wet and dry-salting) in a oxidation of fat during storage of cur Fish treated with butylated hydroxy (BHA) at concentration of 0.01% in representing from 0.005 - 0.02% of the w raw fish, showed no detectable signs of r after 60 days' storage while untreated became distinctly rancid in 17 days. protocatechuate (EP) and propyl gallat were less effective than BHA, and a brown off-color especially in the abdomin developed in the products treated wit antioxidants. In experiments with 'A (salted salmon) which is kept for long contact with salt, it was observed that tert-butyl-p-cresol (BHT) in concentra 0.0025-0.005% of the weight of raw f most effective. BHT was more effecti BHA which was effective at a concentr about 0.0025% but employed in excess concentration, imparted a yellow off-c the abdominal parts of the products. gallate + citric acid (Linton C) was co unsuitable since it caused violet off-c did propyl gallate.

Tanikawa, E.; T. Motohiro; H. Is Fujii and K. Yachi (1956). on the complete utiliza squid-XII. On the decom velocities of summer and squid meat. *Bull. Fac Hokkaido Univ.*, 3 (1) : 49-6

..... and K. Tomita (1956). St the complete utilization o XIII. Relation between f of raw squid and the quali dried product. *Ibid.*, pp. 1

.....; Y. Nagasawa; T. Takenchi and T. Sugiyama (1956). Studies on the complete utilization of squid - XIV. Relation between the water content of squid meat and putrefaction during drying. *Ibid.*, pp. 172 - 184.

ifferences were observed in the quality mposition velocity of dried, salted or roducts made from summer and autumn These differences are ascribed to dif- in histological features, chemical nts, the solubility and the quantity l water in the two groups of squid.

aw squid meat containing more than 20 volatile basic nitrogen did not result cts of good quality.

was observed that during drying of eat when the moisture content reached he rate of decomposition becomes 1/10th as at higher moisture contents. In weather (80% relative humidity, 11 m / d velocity and a reasonably bright sun), ture content of the meat reaches 50-55% enough before any appreciable decom- can take place. The authors suggest drying during unfavorable weather.

a, Y. and Y. Sato (1956). A rapid method for the determination of moisture content in fish meat - II. Relation between error of estimation and fat content. *Tohoku J. Agri. Res.*, 7 (3): 273 - 276.

he authors demonstrate that the methyl lehydration method [(Tsuchiya, Y. and no (1954). A rapid method for the nation of moisture content in fish meat. *J. Agri. Res.*, 5 (2): 93 - 97.)] is applicable mination of moisture in fatty fish within of + 1.9%.

S. (1957). Studies on the discoloration of oily fishes. Rep. *Western Sea Fish. Res. Inst. (Japan)*, no. *12*: 43 - 59.

escribes a method for measuring the ation of oily fishes by an examination of erences in the optical density of the of the color matter in a mixture of lcohol and benzene. Oily fishes dried ling were crushed and passed through of more than forty meshes. Accurately d quantities (0.5 g.) of the sample were extracted with an azeotropic mixture (10 cc.) of methyl alcohol and benzene by shaking and subsequent centrifuging. The optical density of the clea solution was measured in a photo-electric colorimeter using S Filter 43. Distilled water was used as a standard.

Tsuchiya, Y.; T. Vakano; T. Wesaki and W. Ara (1957). Studies on the utilization of electro - smoke solutions. *Fish. Sc. Coll., Tokyo Univ. Press*, pp. 855 - 862 (In Japanese).

(1) Components of electro-smoke solutions prepared from oak, sundry timbers (pine, *Cryptomeria* etc.), orange peel, and rice straw were studied for observing differences in the quality of the electro-smoke obtained from these sources.

(2) It was observed that the bactericidal and bacteristatic properties of the electro-smokes were due to the presence of volatile matters, mainly consisting of formaldehyde and of phenols. It was also observed that the bactericidal components lay in the tar portion of electro-smokes.

(3) Studies on the rancidity of mackerel smoked by dipping in a mixture of salt and electro-smoke solutions, showed that these solutions possessed considerable anti-oxidant properties as did butylated hydroxy-anisole (BHA) and nordihydroguaiaretic acid (NDGA).

In *Malaya* experiments were conducted in the storage of dried fish in cans sealed in CO_2 and air.

Batches of Ikan Bilis *(Stolephorus* sp.*)*, Ikan Gelema *(Sciaena* sp.*)* and Selar Kuning *(Caranx* sp.*)* were dried for 1½ days in the bright tropical sun and packed in 4-gallon kerosene cans and sealed in an atmosphere of air and carbon dioxide. Samples were taken out periodically and the fish examined for quality through a taste panel. Bilis remained excellent even after 6 months, both in the air and carbon dioxide pack. The other two varieties deteriorated much quicker in the carbon dioxide pack than in air. The Selar became absolutely unfit for human consumption after about 4 months both in the air and carbon dioxide packs. It was suggested that the keeping of Bilis is attributable to drying to a satisfactory degree before it was packed, the fish due to its small size having completely dried in about 1½ days, and the moisture content in the other two varieties,

which are large in size, were rather high at the time they were packed.

The above experiments and the results are described in a paper (IPFC/C 55/TECH 2) presented at the current Session of the Council.

Experiments were conducted at the Technological Laboratory of the *East Pakistan* Directorate of Fisheries on the preparation of improved quality cured fish. The process of full salting and drying as practised in many countries was not satisfactory as in the highly humid climate of East Pakistan, the finished product absorbed considerable moisture, due mainly to the hygroscopic properties of the salt in the product, and deterioration was hastened.

A different method was then tried. The fish was washed, scaled, gutted, once more washed and cut into fillets or strips not exceeding one inch in thickness. These were then soaked in a 15% brine for half an hour to wash out slime and blood. The brined pieces were washed quickly in fresh-water to remove traces of scum or salt, drained and dried in the sun until the moisture content came down to about 20%. The pieces were finally smoked until the moisture content reached about 17%.

Fish cured by a combination of light salting, drying and smoking as mentioned above was found to possess good keeping qualities in humid climate.

In the *Philippines*, a new process for the production of split-salted dried fish was standardized with the production of a high quality salted fishery product. Although the product turned slightly brown on storage in humid climate, there was no sweat on the flesh nor any growth of mold. The product contained no chlorides and sulphates of calcium or magnesium; its sodium chloride content was also lower than in the products obtained by the usual processes.

A paper describing these experiments and the results is presented at the current Session of the Council (See IPFC/C58/TECH 7).

Experiments were performed in Thailand for the production of dried 'hoi Kreng' (Arc shell) meat. The cleaned shell was boiled in 10-16° Be brine for about 10 minutes, the meat shucked and dried in a charcoal heated drying chamber for 2 hours at 50-55°C and for another 10 hours at 60-70°C. At 15% moisture content, the yield was about 4-5% in weight of shellfish, the fresh meat content being 20% fresh shellfish. The dried meat was analy protein, fat, moisture, salt and ash. In s conditions of average 28°C temperature a relative humidity, the product kept well weeks when the moisture content was 2 for 3-4 months when the moisture conte 16-18%. Mold developed if the produc stored in open air for too long, while stor household refrigerator, it kept good for time. (See also IPEC/C 58/TECH 9).

In order to effect possible improve a study was made of the present practi commercial production of boiled (steame Details of the different methods for boilin recorded, and the products obtained different methods analysed. It was ob that fish boiled once in saturated brine minutes kept good when stored in open 2 days, but the fish boiled a second time minutes kept good for 7 days. When st a household refrigerator, there was no det signs of spoilage in 14 days but the became hard and dry due to desiccation. experiments for packing the fish in pol bags are planned. (See also IPFC/C58/TE

Attempts were made for smoking 'p *(Rastrelliger)* by exactly the same meth commonly applied in Thailand for s freshwater fish. The gilled, eviscerated, and drained fish treated for 30 hours with generated with sawdust and coconut hus a hard-dried product deep in colour. A obtained by first drying for 15 hours wit coal fire (60-70°) in a smokehouse an smoking for another 15 hours at 50-60° the same dryness as in the previous ca had much better color. A product obtai brining at 14° Be or in saturated brine minutes, prior to drying and smoking, cheese-like taste. The products obtai the different methods were chemically a for their contents of protein, fat, salt an ture. Stored in baskets in open air, the was attacked in 1-2 weeks by a kind of In 1-2 months this beetle ate the whole caused it to be powder-like.

The only activity in the *USA Trus tories* was in respect to curing of *Trochus* This work has been reported in "*Trochus* of the Trust Territory of the Pacific Is by John A. McGowan. The report is av

Trust Territory of the Pacific Islands, Guam. Very briefly, the report points *Trochus* shelled and dried may be stored nsiderable time before consumption.

reliminary results of experiments in for preventing rancidity of fats in dried h antioxidants e.g. butylated hydroxy etc., were satisfactory.

plication of research results

n the States of *Kerala* and *Madras*, *India*, curing yards were maintained by the nents. The curers who obtained space yards, either free or on rental, were free their primitive techniques for curing, g and storage. The quality of the s from these yards was consequently actory.

Attempts to improve storage of cured fish tructing suitable sheds were also made bove two States. Loans were granted mber of cooperative societies for con- g storage sheds according to designs d by the Governments concerned. A m program for constructing similar sheds for cured fish and other fish s on the West and East coasts at impor- ding centers, and at wholesale and retail s were prepared for implementation in stages. The information resulting from gations was made available to the indus- ough the Central Fisheries Extension and attempts were made to popularize Samples of cured fish produced experi- ly by different methods of processing were ed at Fisheries Exhibitions and the s of preparation of the products explained. ted Bombay duck product was also d to the trade for local sales and for to foreign countries.

Financial assistance was given for improv- e sanitary conditions of the Government uring Yards in the States by provision of platforms, curing sheds and better ge facilities.

In *Japan*, application of the results of h conducted by Central Government h laboratories as well as by those of non- mental and private organizations, was d through extension activities of Fishery ments of Prefectural Governments in ation with Prefectural Experimental Sta- tions which gave practical advice to the industry. Where necessary, technical training courses were sponsored by the Prefectural Institutions for the benefit of local fishermen and small-scale industry.

Attempts were made in *Malaya* to introduce to the East Coast the Chinese methods of producing salted-dried fish, which were widely practised on the West Coast. These methods were demonstrated on the former coast. Early acceptance of these methods by the industry on this coast was expected.

The Technology Section of the Department of Fisheries, *Thailand*, presented a report on 'Quick Determination of Moisture in Cured Fish' at a meeting of agents and exporters of cured fish. The method which is simple, takes about 10 minutes to perform, and can be easily performed by non-technical personnel in the industry for preliminary grading of the cured fish on the basis of moisture content, was also demonstrated at the meeting.

5.3 Quality standards for cured fish

The Government of *India* contemplated gradual introduction of quality standards for cured fish and other fish productions with voluntary cooperation of the industry. Such standards were in preparation.

Quality standards for important fishery products for domestic use as well as for export were in force in Japan pursuant to regulations promulgated by the Central Government. These products were: (i) dried products including those of herring, herring roe, cod, shark fin, squid, scallop adductor, abalone, sea cucumber (ii) boiled-dried products including those of herring and salmon; (iii) salted fish of various kinds; and (iv) miscellaneous products including seed oyster, agar-agar, fish meal and marine animal oils.

Quality standards for exportable salted fish introduced in *Thailand* a few years back continued to be in force.

6. Fish Flour for Human Consumption

The Nutrition Division of the Public Health Department in *Burma* was engaged in the development of fish flour for human consumption. It was assisted in this task by an FAO/ETAP nutrition expert.

The cost of fish flour was found prohibitive for the Burmese. On the other hand, they preferred the flavor associated with fish meal but lacking in fish flour. Acceptability tests successfully demonstrated the possibilities of popular acceptance for human consumption of fish meal prepared from anchovies *(Stolephorous sp.)*. A private firm with extensive interests and wide experience in Burmese fisheries, was keenly interested in producing fish meal for human consumption. Government permission for this firm to go ahead was witheld on the ground that the processing techniques for the production of the meal were not adequate enough to completely destroy the *Clostridia*.

In India the following paper was published:

Krishna Pillai, V. (1956). A fermentation process for the production of quality fish meal. *Curr. Sci.*, *25 :* 293-94.

An earlier observation that fishy odor of shark liver oil was completely removed by agitation of oil with fermenting milk for 36 hrs. suggested the possibility of preventing rancidity development in fish meals by treatment with fermenting milk. Eviscerated and de-scaled fish were minced and stirred with defatted butter milk (about 1 oz. [8.4 ml.] to 6 lb. [2.72 k minced fish) and the whole, well mixed small quantity of water. The pH was mair between 4.5 and 5.0 and temperature at 35°C. (86° to 95°F.) The reaction was cor to take place for 4 hrs. after which the ma pressed, dried and powdered. For comp 3 types of fish meals were made by (1) sun-drying of untreated fish, (2) dry precooked fish and (3) treating fish with f ting milk, pressing and drying, from 5 d spp. of fish, e.g. *Sardinella albela*, *Sar gibbosa*, *Illisha brachysoma*, rays and *(Carcharinus sp.)*. Preliminary obser indicate that even after 9 to 10 months of in glass bottles, the treated fish meals d develop the characteristic rancid odor moisture, fat, total and water soluble n contents of the meals are given in table The results show that the oil content meal is reduced by the fermentation trea It is suggested that this method of pre odorless fish meal is suitable for use with d varieties of fish such as sharks and may h to prepare odorless fish flour for human co tion. An advantage over traditional m is that the fermentation treatment is chea

Analysis of fish meal made by addition of fermenting milk to fish.

Name of fish from which the meal was made		Moisure %	Fat %	Total %	No protein %	Water s N as Tota
Sardinella albella	a*	6.1	8.8	—	—	
— do —	b*	7.0	3.7	13.30	83.13	3
— do —	c*	6.4	4.1	14.35	89.68	15
— do —	d*	8.3	1.1	—	—	
Sardinella gibbosa	a	6.1	10.1	11.90	78.38	17
— do —	b	9.8	6.0	13.50	84.38	6
— do —	c	5.8	6.2	14.00	87.50	10
Illisha brachysoma	a	7.2	7.1	—	—	
— do —	b	6.8	4.1	12.95	80.94	6
— do —	c	9.0	3.4	13.30	83.13	10
Shark	a	7.2	1.8	14.00	87.50	18
— do —	b	5.3	0.8	14.94	93.38	6
— do —	c	5.8	0.6	15.08	94.25	18
— do —	b	8.4	0.6	14.78	92.38	5
— do —	c	9.2	0.3	14.50	90.63	11
Ray	a	9.2	3.2	—	—	
— do —	b	9.9	1.3	14.35	89.68	9
— do —	c	7.6	2.2	14.35	89.68	16

* a : simple, sun-dried and powdered ; b : cooked, pressed, dried and powdered ; c : fern pressed, dried and powdered ; d : solvent extracted, dried and powdered.

t the Technological Laboratory of the s Department of Bombay some experi- ere conducted for the manufacture of fish m dry fish and waste liver debris.

ceptability tests were carried out on ry scale. Fish flour prepared from shark e flesh by the fermentation process were ordinary food preparations like 'chappa- akes, biscuits, vermicelli, etc. Up to weight of fish flour were incorporated in ve food preparations without producing odor or flavor. Investigations regard- nutritive and biological value of the s were still underway. Large scale trials larize consumption of fish flour as a o combat protein malnutrition are yet to rtaken.

ollowing improvements in food situation n a few years after World War II, all activities in the development of fish r human consumption virtually ceased, before and during the war an extensive orous program of research was pursued ield. During the few years after the War urces of animal protein were in seriously upply, fish flour was used with wheat baking bread, biscuits etc. Fish paste d by fermentation of fish flour was used id on bread. At present, however, none products is produced in any appreciable y.

erhaps, 'denbu' and 'furikake' are the o items of processed fish flour still n the shelves of Japanese grocery stores. mer is fish flour, mostly of cod, cooked asonings, e.g., soyabean sauce, salt, sugar ium glutamate. In preparing 'furikake' les), fish flour is boiled down in one or f the above seasonings until about dry. then completely dried and seaweed added to it.

Given below are statistics on the produc- fish flour for human consumption in Japan. ee Appendix I);

Year	*Quantity in Metric Tons*
1951	1,148.2
1952	2,979.0
1953	1,857.3
1954	1,249.8
1955	655.5
1956	1,336.8

Tests on the acceptability of good quality fish meal for human consumption were sponsored in *Thailand* jointly by the Department of Health and the Department of Fisheries. The tests were carried out by trainees of the Thailand - Unesco Fundamental Education Project, under the supervision of the Nutrition Officers of the FAO Far East Regional Office.

Fish meal instead of fish flour was used in the tests as the fish flour was very expensive and as fish products e.g. fish sauce (nam pla) and shrimp paste, which according to western standards have disagreeable odor, are already popular items in the Thai diet.

The meal used in the tests was produced locally from 'pla-thu' (*Rastrelliger* sp.) and some slipmouth at a fully mechanized fish meal plant at Chumphorn nearly 450 miles south of Bangkok. Before the tests, the meal was chemically and bacteriologically analyzed.

Ten grams of the meal (equivalent to 6—6.5 g. protein and 0.5—0.7 calcium) was given daily in school lunch for 5 days a week for one month to 136 school children (7—12 years old) of Nongkorn village, Ubol province, and to 130 children of the Chat Songkram School, Bangkok.

In addition, 25 Bangkok families in the low income brackets and 150 families of Nongkorn village in the Ubol Province, known for its acute shortage of animal protein, received daily rations of 15 g. of the meal per head.

The meal was served to the school children in different preparations including curries, vegetable dishes, and fish pastes, the recipes for which were supplied by the Department of Health, while the families received instructions for the preparation of the dishes according to the recipes.

Between 75—100% of the children in the Bangkok school liked the meal served in four of the six recipes; while 75—90% school children in Nongkorn village almost equally liked six of the seven different preparations in which the fish meal was served; 63% of the families in Nongkorn village favored acceptance of the meal for food while Bangkok families did not care for it at all.

Offered at 4 Bahts* a kilo, only 12% of test subjects were willing to buy the meal.

Further tests were planned, and to improve the quality of the meal further, the producer

*U.S. $ 1.00 = 20 Bahts approximately

was advised to improve hygiene and sanitation in the plant, modify the processing to ensure complete destruction of pathogenic bacteria, dry the meal to a moisture content of 8%, grind the meal into finer particles, sieve the coarse bone particles off, pack the meal in moisture-proof multi-lined paper bags or tin cans, and not to offer the meal for human consumption if stored for more than six months (see alo IPFC/C58/TECH 11).

7. **Use of local vegetable oils for canning**

In Indonesia, experiments were performed for rendering coconut oil suitable for canning of fish. Attempts were made for lowering the solidification point of the oil by blending it with various proportions of corn oil, cotton seed oil, glycerin, peanut oil, rice bran oil and soya bean oil. Data indicated that, the rice bran oil was the most suitable, having at 10% concentration lowered the solidification point of coconut oil to 10°C which was considered low enough in Indonesia for its use in fish canning. A detailed description of these experiments and results are presented in a technical paper presented to the current Session of the Council (IPFC/C58/TECH 3):

8. **Fishery Products Manual**

Japan furnished data on six represe products. These were: Shiokara (fer fish viscera), Satsuma-age or Age-Ka (fried fish jelly product), Fish sausage, Tsu (small fish boiled in soya sauce), Katsu (dried strips of fish) and Niboshi (boil dried fish).

Pakistan furnished information Salted Hilsa and Smoked Prawn.

9. **FAO Regional Training Center i Processing**

Informal explorations were made f ing a host government for this training Should an offer reach FAO soon, the might be budgeted for 1960.

10. **T.A. Group Country Project in Fish**

No Government communicated actions to this recommendation.

11. **FAO Regional Consultant in Fish Pro**

No final decision has been ma Fisheries Division, FAO, on this proposa

FISHERIES ECONOMICS
(PANEL C)

STATISTICS

12. AUSTRALIA

Australian fishery statistics are reasonably satisfactory. Certain collections are excellent; for example, those covering the pearling and whaling industries, and imports and exports of fish and fish products. Statistics covering catch by species are also adequate. Data relating to disposition of catch are not entirely satisfactory but certain improvements are planned, and it is hoped that existing discrepancies will be rectified. Generally, statistics may be considered under the following headings:—

12.1 **Pearling and whaling**

Collections made by the Commonwealth Fisheries Division, Department of Primary Industry, under relevant pearling and whaling legislation, are quite adequate and, in fac than sufficient for industry and depar purposes.

12.2 **Scale fish, shark, mollusks and cru**

In all States, excluding South A where no fisheries statistics are co collections are made by the various fisheries authorities. The data is c directly from the fishermen, processe passed to State and Commonwealth Depa interested in such statistics. Since 1 accordance with FAO commitments, pro and disposition statistics have been pu by the Commonwealth in accordanc certain formulae designed by F.A.O. it has not always been possible to meet specific requirements, collections have improved with the result that present lian statistics, covering production of

position, are reasonable and sufficient purposes. However, statistics relating g effort, production by fishery rather ite, etc., are incomplete. The com- th Bureau of Census and Statistics, in ion with the Commonwealth Fisheries plus certain State authorities, is keen s position be rectified. In addition, ction of fisheries statistics in South is also receiving close attention. The ssumption of State statistical functions ommonwealth should assist materially oving all fisheries collections. This on fisheries statistics between Com- th and State authorities has proved of able benefit and will facilitate planned ments to Australian fisheries statisticis.

ports and exports of fish and fish oducts

atistics covering these items are col- the Commonwealth Bureau of Census istics. With regard to exports, parti- rustacea, data provided by the Bureau emented by information supplied by artment of Primary Industry. Informa- n all sources is quite adequate.

13. INDIA

he General position with regard to n and processing of fisheries statistics country is still unsatisfactory. The Central Fisheries Research Station at Mandapam had developed its own sampling technique and have collected statistics of marine fishermen, gear, fish landings on a whole country basis. The maritime States continue to collect the figures of fish landings from the fish curing yards.

The sampling technique of assessment of production from inland fisheries is yet to be evolved and figures on the basis of total enumeration are available on regional basis. Even these do not pertain to the same year of observation.

In the absence of a central agency coordinating the statistical organization in the States it has not been possible to have comprehensive figures on the different aspects desired by the IPFC. Figures as available are given below.

13.1 *Number of fishing vessels :* For the whole country as enumerated by Central Fisheries, the figures exclude trawlers which are few in number and are working on an exploratory basis only.

Catamarans	 49,132
Boats	 20,594
Canoes	 22,343
Boats fitted with motors	 672

Bombay State

	Below 1 ton	Between 1 & 3 tons	Between 3 & 5 tons	Between 5 & 10 tons	Between 19 & 20 tons	Above 20 tons	Total
zed	Nil	95	79	697	127	1	999
hanized	5,745	5,966	1,548	960	296	192	14,707

State

atamarans	23,161
oats	4,716
ower Boats	38

State

atamarans	18,863
oats	6,340

No. of fishermen

Marine fisheries as per sample survey by the Central Fisheries are 221,600.

Bombay State

Active fishermen	52,000

Madras State

Marine	63,100
Inland	12,745

Chilka lake

Men	... ...	16,094
Women	... ...	15,456
Fishermen (Bahania)	... ...	8,079

Ganga river (Bulandshar to Lalgolaghat)

Men	... ...	54,283
Women	... ...	54,208
Children	... ...	91,055

Mahanadi estuary — 3,747

Jamuna river —

Men	... ...	30,797
Women	... ...	20,681
Children	... ...	34,055

Godavari estuary —

Active fishermen 5,500

13.2 **Fishing craft and gear :**

Fishing method used for the whole country as per sample survey by the Central Fisheries.

(i)	Shore seines	9,823
(ii)	Boat seines	37,394
(iii)	Bag nets	38,062
(iv)	Gillnets	55,225
(v)	Drift nets	28,218
(vi)	Cast nets	26,807
(vii)	Dragnets	10,915
(viii)	Fixed wall nets	8,142
(ix)	Other nets	9,164
(x)	Lines	45,743

Madras State

(i)	Boat-seine nets	10,057
(ii)	Drift-nets	21,085
(iii)	Gillnets	30,503
(iv)	Shore seines	1,570
(v)	Dragnets	12,248
(vi)	Stationary nets	5,987

In the case of inland fisheries, no statistics are available. The mode of fishing being confined to:

1) Seining
2) Hook and line
3) Traps in order of precedence.

13.3 **Cold storage facilities**

Although additions of cold stores have taken place in various maritime States, the facilities are quite inadequate. Ice factories have however, increased appreciably in number and private enterprise is forthcoming for this industry. Bombay has 81 ice factories belong private parties and one ice factory run State. It has 22 cold stores belonging to parties with a capacity of 257 tons a belonging to the State with a capacity of 5 Ice making capacity of private factories i tons per day against 20 tons by the Gove factory.

Madras has 27 ice factories with a c of 70 tons and one cold store with a capa 10 tons. Orissa has 5 ice factories with a c of 50 tons and one cold store of 15 tons erection. Figures for other States ha been available.

13.4 **Processing facilities**

Fish curing continues to be the pr method of processing in the fish curing while most of the inland fish is consumed fresh condition.

Bombay — (Comparative figures are avail below).

Total Production of Fish	— 2 lak
Quantity sold as fresh	— 1.2 lak
Quantity dried	— 65,0
Quantity salted	— 15,0

Madras — Total production of fish

(i) Inland	40,3
(ii) Marine	67,5
Quantity sold as fresh fish	66,9
Quantity dried & salted	40,4

14. JAPAN

14.1 **3rd Fisheries Census**

Since competent and reliable sta data of fisheries are essential for planni development of fisheries and its enfor and other appropriate measures, IPFC ha stressing for some time the importance of a proper census of fisheries and adopted a tion at its 7th Session for enforcement census of the number of fishing ves operation, the number of fishermen enga the industry and fishing methods used, t with cold storage and processing faciliti (ii) collection of statistics on overa production, together with statistics on uti and trade in respect of species of major ec importance.

tatistics on fish production and fishing in Japan have been collected for many nd through the adoption of sampling s in fish production statistics and regis- system in fishing vessels statistics, we ceeded in obtaining statistical data of orrect and reliable quality. But in view ecessity of development of the statistics and for the purpose of surveying the structure of fisheries enterprises in the country, including fishing vessels in n, the number of fishermen engaged, s operations, subsidiary business, etc., a wide fisheries census was initiated in The census has been enforced ever since ve years.

he 3rd Fisheries Census is scheduled to ducted this year in the following way. all survey should be made in regard to ole fisheries enterprises amounting to in number by about 1,000 statistical ers attached to 41 Regional Statistics under the Ministry of Agriculture and in cooperation with the prefectural ments The total sum of expenses for the census is about 35 million yen.

he special items of survey in the census me include the present situation of rights in exercise and fisheries coopera- function, which are expected to furnish important basic data for the proposed l policy of coastal fisheries promotion, ngeover of fishery rights scheduled for nd the improvement of the present s system.

.4.2 Survey on the Management of es Cooperatives

arious fostering and reinforcing measures eries cooperatives have been taken these several years by the Government. mmended at the 7th Session of IPFC, tual survey of fishermen's cooperatives important for this purpose. In Japan, ided for by the Fisheries Cooperative tion Law, a regular inspection is conduc- e every year in regard to the affairs of s and account of those cooperatives pital stock. Later in 1951, an overall was carried out on fishermen's coopera- r the purpose of clarifying their general which includes statistical data and the f development and change.

In view of the remarkable changes which have been taking place in the status of cooperatives, the 2nd overall survey was conducted this year as a link in the chain of the 3rd fisheries census program, and at the same time a statistical survey was enforced in regard to 300 cooperatives which have been randomly sampled by regions and by types out of about 4,400 primary cooperatives. With regard to the 100 cooperatives selected from among those randomly sampled, a dynamic survey is also made on their economic activities of various types.

15. PHILIPPINES

15.1 Minimum Program of Statistics

With regard to the minimum program of statistics adopted by the Council, the Bureau of Fisheries cannot undertake a census of the number of fishing vessels or the number of fishermen engaged in the industry due to lack of funds. However, the Office has complete data on the number of fishing vessels of 3-tons gross or over, the number of fishermen working on these vessels and the fishing methods used. An inventory of fishing methods was undertaken in 1953. Such similar inventory will be undertaken in the near future.

Statistics on overall fish production, together with statistics on utilization and trade in respect of species are as usual complete.

15.2 Raw Material Resource Survey

There is presently being undertaken a project, "Raw Material Resource Survey" covering the four raw material fields, namely, minerals, forestry, agriculture and fisheries. The project contemplates to determine the extent and location of each of the raw materials available in the country depending upon the availability of data including past and current utilization, exports, imports and such data which may shed light on the commercial feasibility of undeveloped raw material resources. Their known potential for exploitation, intermediate and/or end-uses, will be taken into account as basis to determine the specific items of material to be covered.

Facts and figures available from all sources, public and private, will be gathered according to prescribed procedures and forms for analysis and evaluation and put together to be published in a comprehensive compendium

of facts on raw material resources in the Philippines.

The conduct of the survey is under the responsibility of the Office of Statistical Coordination and Standards, National Economic Council, with the close collaboration of the Office of National Planning, National Economic Council, Industrial Development Center, National Economic Council and the pertinent Offices under the Department of Agriculture and Natural Resources.

SOCIO-ECONOMICS

16. INDIA

16.1 General Notes

The Reserve Bank of India is the authority in providing credit facilities for fisheries development and various State Governments obtain credit for the Cooperative Banks from the Reserve Bank, terms and conditions differing according to the purpose and nature of credit. Hitherto the fishermen have not been considered creditworthy and as such the flow of loan has been on the basis of the State Governments standing as guarantee for the loan. Naturally, this has limited the borrowed funds considerably and at present the Government of India, Ministry of Food and Agriculture are negotiating with the Reserve Bank to evolve suitable ways and means for flow of credit through normal banking procedure.

Regarding fish marketing, the responsibility vests with the States and this line has not developed as most of the State Departments of Fisheries are still in the formative stage. In some of the States fish marketing is the responsibility of the Cooperative Department, whereas in a State like Madras, the Fisheries Department has to look after this aspect with officers deputed from the Cooperative Department. On the whole, real progress in marketing is yet to be achieved and the report of Prof. Laidlaw, a visiting expert is now receiving consideration by the Center as well as the States.

The present fish markets are controlled by the Corporations or the Municipalities and the effort to establish sanitary markets has been confined to Bombay, Delhi and Calcutta till now. The Municipalities have their own rules under the act and they seek advice of the Fisheries Department only in very special Government of India have now agreed t liberal grants and loans to ertablish st facilities and improve markets, and va schemes are under preparation to assis Municipalities to have suitable fish ma The question of regulated markets is also considered. It is visualised that there w appreciable progress in this direction d the 3rd plan period starting from 1961.

As is well known, the fish passes th a number of hands from producer t consumer. Government policy is to enco producers cooperatives and eliminate or re the remunerations of the middle-men. Co tive Departments are organizing prod cooperatives in almost all the States. cooperatives are given facilities of t Business Manager, subsidies in manag expenses and godowns, loan of share c etc., and encouraged to market the pr jointly. Bengal has introduced a Coope Production Scheme for the Sundarbans. has finalized a scheme of cooperative mark from the Chilka Lake which has been operating for the last 7 years. Similar has been taken by Saurastra, Madras Bombay.

The wholesale markets where a s of auction prevails continue to be in a pri condition particularly in Calcutta and it is for the producers to expect a fair deal the present set-up. Excepting a licence the Government of Bengal, there is no regu of the market and the wholesalers se under extremely insanitary conditions.

The Central Ministry has taken u question and it is likely that the new fis law will take care of this aspect.

Price control: There is at prese regulation to enforce price control at di levels. There is also no control on expo import except under the general poli Government revised from time to time, li being given to individual cases on thei merits. Export and import duties als regulated periodically.

Supervision in the markets is confi the Municipal Health Officer and his which is not adequate.

There is little effort as yet to do quality g but technological research has been up by the Central Fisheries as well as tate Departments of Bombay, Madras, l and Orissa to utilize various by-products. liver oil is being produced commercially the maritime States. Orissa has been o finalize the technique for production of gar, and hydrolysed protein. Central ies have evolved a cheap method of ing good quality fish meal. Frozen fish ry has developed in Bombay and Malabar Experiments in freezing and frozen fish e have been taken up in Orissa and the l Food Technological Research Institute rying out experiments in packaging. has received assistance from the FAO her organizations to provide marketing s who have studied the problem visiting ates individually and have given their .

Factual Survey of Fishermen's Cooperatives

There is little to add to this section uent to the reports sent for the training at Hong Kong. Substantial development peratives in the fisheries sector has not place in the country as a whole or on a al basis.

Bombay has 101 fishermen's cooperatives total share capital paid up amounting to 017,454/—. Number members are 25,484 ey have incurred loans as below.

Government loan..... Rs. 242,240
Cooperative Bank Loan ..... Rs. 502,250

Madras has 196 cooperatives with a total p share capital of Rs. 190,021/— and a rship of 23,855. The loan incurred is ,480/—.

Credit Facilities

The rural credit survey has taken some t of Fishermen's Cooperatives but as equate credit facilities are not available shermen's Cooperatives. Cooperative require adequate security which precludes y of fishermens' combines to get loan. ate Governments, have, in a few cases, ed loan against security on gear at their isk but necessarily such amounts are . In Bombay, the rate of interest varies between 5 to 6½ per cent as charged by Cooperative Banks. Government loans are charged at 5½ per cent. In Madras there are 3 types of loans. Long term loans are for a period of 10 years, medium term loans are for 5 years and the third type is for construction of godowns. In all cases an interest of 5½ per cent is charged.

16.4 Fishermen's Cooperative Societies in Madras State

The Cooperative principle can be applied to all branches of economic life. Just on the model of village rural credit Cooperative Societies for agriculturists, Cooperative Societies for fishermen, inland and marine have been organised, under limited liability basis with the object of acquiring and holding water courses such as rivers and tanks by purchase or lease for catching fish by members jointly or individually; to purchase or hire modern craft and tackle for increasing the catches by deep sea fishing; to purchase or hire quick transport vans for better marketing of fish and for the joint sale of their products. There are 179 Fishermen's Cooperative Societies in Madras State.

The fishermen in Madras State are mostly poor and many of them are indebted to money lenders, merchants and middle men within or outside their community. In their poverty and indebtedness, many fishermen are unable even to own a country craft or tackle, not to speak of any modern equipment for fishing. With a view to relieve them of their indebtedness and to provide them with crafts and tackles a scheme was drawn and approved by the Government. This scheme provides for the grant of long term ten year loans to the fishermen through Fishermen's Cooperative Societies for the following purpose :

I (a) for clearing partly their prior debts to money lenders ;
(b) for mainly purchasing fishing equipment such as crafts and tackles and other requisites for fishing ;

II (a) for purchasing motor vehicles for transport of fish ;
(b) for purchasing or constructing buildings such as godowns, curing sheds and tanks for the storing or processing of fish or fish products and

(c) for purchasing, constructing and for erecting machinery, plant or other appliances for demonstration of improved methods of fishing and for the preservation, processing or marketing of fish or fish products.

Only fishermen, who are members of registered Fishermen's Cooperative Societies are eligible for those loans.

Under the scheme each society has been granted loans to 40 members not exceeding Rs. 500/— per member or Rs. 2,000/— per working unit and not exceeding Rs. 20,000/— per society. The loans are granted to fishing units, comprising generally of three or four members on the personal security of two or more members of solvency or on the mortgage of unencumbered immovable property belonging to the borrower or borrowers. The fishing equipment such as craft and tackle purchased out of the loans shall be mortgaged to the Society. The crafts and tackles for the purchase of which the loans have been issued shall be purchased within one month from the date of issue of the final instalment or within 3 months from the date of issue of the first instalment; whichever is less. Loans amounting to Rs. 2.70 lakhs were disbursed to 26 Fishermen's Cooperative Societies and 832 fishermen were benefited by the loans in 1956-57. Out of the loan of Rs. 2.70 lakhs, a portion has been utilized by the fishermen for discharging of prior debts and a major portion has been utilized for purchasing crafts and tackles. A short term loan of Rs. 15,000/— was also given to Periathalai Fishermen's Cooperative Society as a relief measure to tide over the famine caused by failure of fishing season.

A Fishermen's Cooperative Marketing Society was organized and started on 7.10.58 at Mettur Dam in Salem District. There are about 313 members with a paid up share capital of Rs. 1,755/—. For managing the affairs of the Society and to attend to marketing of fish, writing up accounts, the services of one Senior Inspector and one Junior Inspector of Cooperative Societies are placed at the disposal of the Society free of cost. Loans amounting to Rs. 13,500/— were issued to 118 members for discharging prior debts and for purchasing crafts and tackle during 1956-57. 243 members have taken licences for fishing in the Reservoir during 1957-58 and a licencees are members of the society. market their entire catches through the s since 1957. The daily coverage on the c is 1,200 lbs including the periods when c are poor or nil on account of the very h low level of water in the reservior.

For the second year of the secon year plan, viz., 1957-58, the Governme sanctioned the following loans and subsid

1. Long term loans to 20 Fishermen's Cooperative Societies at the rate of Rs. 12,000/— per society repayable in 10 years. } Rs. 2

2. Long term loans to two federations at the rate of Rs. 2,000/— per federations one for S.A. District and another for Kanyakumari District. } Rs.

3. Long term loans to Cooperative Societies and federations for construction of godowns, curing sheds, etc., at the rate of Rs. 2,000/— per society or federation. } Rs.

4. Medium term loans to fishermen at the rate of Rs. 200/— per member repayable within 5 years. } Rs.

Subsidy to Cooperative Societies and Federations for construction of godowns etc., at the rate of Rs. 2,000/— per society or federation. } Rs.

A major portion has been draw disbursed and the balance also will be ex before 31.3.58.

16.41 Assistance to Fishermen's Coop Societies

Mechanized boats (called Pablo bo nylon nets have been given to the fo Fishermen's Cooperative Societies and tions for deep sea fishing on loan and basis and the loan portion is recovered instalments without interest.

ame of Society	Pablo boat No.	Value Rs.	Nylon nets and Terylene, Qty, Net Nos. Yds./Lbs.	Webbing supplied Value Rs.
to Novo Fishermen's perative Society	1	10,000	150	— 1,615
ankuppam Fishermen's perative Society	2	20,000	1 217	578 2,600
lai Fishermen's perative Society	1	10,000	- 150	— 1,450
nevelly District hermen's Cooperative leration	7	70,000	67 882	17,225 9,544
imodu Fishermen's perative Society	2	20,000	6 230	867 2,300
thiyakuppam Fishermen's perative Society	1	10,000	3 110	443 1,050
ttankuppam Fishermen's perative Society	2	20,000	6 226	867 2,260
dras District Fishermen's perative Society	2	27,000	10 128	2,257 1,100
ochal Fishermen's perative Society	2	20,000	48 25	8,542 240
anad Dt. Fishermen's perative Federation	2	27,000	— 300	— 2,900
jore Dt. Fishermen's perative Federation	2	20,000	- 300	- 2,900
icat Fishermen's perative Society	1	10,000	30 7	2,408 67
	25	264,000	(—)	61,212 20,404 40,808

Quick transport motor vans have been to the following societies on hire-purchase There is no subsidy for vans, but the recovered in monthly instalments in a of 7 years with interest at 4½%.

. The Ennore Fishermen's Cooperative Societies.

. The Andikuppam Fishermen's Co-operative Societies.

. The Tirunelvelly Fishermen's Co-operative Federation Ltd., Tuticorin.

4. The Parvatha Rajukula Fishermen's Cooperative Society, Tanjore.

The department also maintains motor vans for hiring out to fishermen for transport of fish from the landing centers to the consuming centers. The following cooperative societies have taken advantage of this facility for the benefit of their members.

1. The Vallambedu Fishermen's Coop. Society.
2. The Kanathur Reddikuppam Fishermen's Coop. Society.

3. The Mettur Dam Fishermen's Marketing Society.

4. The Ennore Fishermen's Coop. Society (in addition to the van purchased by the society on hire purchase system).

16.42 District Fishermen's Cooperative Federations

To develop the activities of the Fishermen's Cooperative Societies, settle matters of common interest such as procuring facilities, purchasing of yarn, logs, boats etc. and in general act as agents of the societies central organizations called District Fishermen's Cooperative, Federations have been started at Madras, Tanjore, Ramnad, Tuticorin and Kanyakumari. A Federation for South Arcot District has been registered and will be started soon. A Federation of inland societies in Chingleput and North Arcot Districts is under organization. One of the main objects of the Federations is to provide facilities for modern methods of marketing which will include quick handling, quick transport, preservation of fresh fish, etc. The societies selected and brought under the loan scheme have contributed between Rs. 600/- to Rs. 1,000/- each as share capital to the Federations. In addition to the above share capital Government has also granted share capital loans of Rs. 2,000/- to each of the Federations which are repayable after 5 years in ten half-yearly instalments.

A scheme for the constitution Fishermen's Distress Relief Fund modif approved by the Registrar of Coop Societies, Madras is implemented through men's Cooperative Federations. The ob the fund is to grant relief to a mem members of the fishermen's families wh with accidents disabling them totally t on the profession or if he dies while eng fishing. The members who join the f their families are eligible for cash re exceeding Rs. 250/- in each case.

16.43 Housing for Fishermen

Under the Harijan Welfare Sc subsidy of Rs. 14,000/- has been sanctio constructing 28 houses in Kasikoilkup Chingleput District, where 28 fisherm their houses in a fire accident at Rs. 5 house. According to the scheme, the c house excluding the site is Rs. 750/- which Rs. 500/- is given as subsid balance is contributed by the beneficiary or in the shape of labor. The local Fish Cooperative Society has undertaken t struction of all the 28 houses on behalf o fishermen who are all members of the So

In addition to the financial aid g Government by way of long and mediu loans; supply of crafts and tackles on l subsidy basis: supply of motor vans for t of fish are hire-purchase basis, i.e., Cooperative Central Banks also exten facilities for periods from one to three y

The Madras District Cooperative Bank helped the following societies in t

S. No.	Name of Society	Amt. borrowed	Period of loan
1.	Kasimedu F.C.S.	1) 1,000	15 months
		2) 2,000	15 months
	Fixed deposits of members	Rs. 1,800.	12 months
2.	Mattankuppam.	1) 4,050	12 months
	F.C.S.	2) 10,000	36 months
		3) 9,745	36 months

In addition to this the Society has secured fixed deposits for periods from five years amounting to Rs. 3,100/- from members and non-members.

3.	Royapur F.C.S.	1,000 cash credit.
4.	The Madras Dt. Coop. Federation.	A cash credit of Rs. 6,400 is sanctioned to the Fe to enable it to buy and stock the requirements of th societies like yarn, sail cloth, coir webbings, et
5.	Thiruvailukam F.C.S.	3,000
6.	Audikuppam Fishermen's Coop. Societies F. D.	from non-member 1,000

he Conjeevaram Central Bank has
o give loans up to two times the paid up
pital of members.

he Ramnad District Cooperative Central
is given Rs. 15,000/- as medium term
the Mookaiyur F.C.S.

he fishermen in Madras State are econo-
socially and educationally backward and
perative Central Banks generally feel
nd to Fishermen's Cooperatives.

ut the impression that the loans lent to
n's cooperatives will prove bad is gradually being dispelled as it is proved by experience in Madras city that the Fishermen's Societies do not lag behind other Societies in the matter of fulfilling their obligations. But the supervising staff had to work intensively by visiting their societies daily to achieve this result.

The credit facilities made available to Fishermen's Cooperative societies during the first two years (1956-57 and 1957-58) of the 2nd Five year plan are as follows:—

	1956-57 Rs.	1957-58 Rs.
g term loans	270,000	244,000
dium term loans		40,000
ans for construction of godowns, curing sheds, etc.		25,000
bsidy for construction of godowns, curing sheds, etc.		25,000
e purchase loans on Pablo boats		194,000
e purchase loans on nylon webbings and terylene yard		40,808
bsidy on boats		70,000
bsidy on webbings and twine		20,404
ner sources of finance		
i) Deposits from members and non-members		5,900
ii) Cash credit from Central Banks		7,400
iii) Loans from Central Banks		29,795
vt. Grant for construction of houses to hermen at Rs. 500/- per house		14,000

17. JAPAN

overnmental Financial Assistance for nall Coastal Fishermen

f the total gross tonnage of about powered fishing vessels now in opera- Japan, 95% is occupied by small boats) gross tons. In regard to large fishing nder the fisheries reconstruction and tation program after the war, a speedy and improvement has been seen in mber and efficiency. But as regards shing boats, though a remarkable was shown in their number to cope food crisis and aggravated inflation in days, they, after a decade from their tion, are now involved in certain in- difficulties such as replacement, improve- efficiency and capacity, etc.

In the case of large boats, their operators, whose financial status is generally high, can raise funds comparatively easily for the construction through common routes of financing institutions. But it is very difficult for the operators of small boats to borrow such funds. In view of such miserable conditions of small fishermen, the Government has initiated since 1956 a 5-year program of special loan facilitation for coastal fishermen, by which 80% of the expenses for replacement of boats and improvement of their efficiency is to be loaned through the cooperatives of which they are members.

This financial assistance is granted to small coastal fishing boats under 15 meters in length for (1) construction, acquisition or improvement of boat, (2) remodeling of engine, (3) equipment of radio, fish finder or generator.

The grant of loan is decided after due consideration of the proposed benefits of fisheries management and the present business status of the cooperative concerned as well as the correlation with other fisheries develo projects.

The results of this program in 19 1957 are as follows:—

		No. of Cooperatives	No. of boats	Busine fund
Applicants:				
	1956	303	3,887	2,499
	1957	348	3,561	1,697
Granted Cases:				
	1956	254	2,791	1,388
	1957	340	3,194	1,464
Performances:				
	1956	85	482	177
	1957	241	1,681 1/	563

1/ includes that number of boats for which loaning was granted in 1956 but whose perfor was carried forward in 1957, as well as the member of those whose performance is c forward in 1958.

18. PHILIPPINES

18. 1 FAO Training Center in Fisheries Cooperatives and Administration

Three Philippine Government Officials, two from the Bureau of Fisheries and one from the Agricultural Credit and Cooperative Financing Administration, participated in the FAO Training Center in Fishery Cooperatives and Administration held in Sydney and Adelaide, Australia, from 16 December 1957 to 25 January 1958.

18. 2 Functions of Middlemen and Cooperatives

The survey of the functions of middlemen and cooperatives has passed the planning stage. Actual survey, however, cannot be carried out due to lack of funds.

A former Professor of Economics of the University of the Philippines, who helped in laying out the plan for the survey, organized a 15-person group, representing different sectors of the Philippine fisheries industry, e.g., fishing boat owners and/or operators, fish pond owners, fish wholesalers, etc., for an observation tour of the fishery cooperatives and marketing system of Hong Kong from July 9 to 17, 1958.

This is the first of a series of observation trips to be organized for the purpose of acquainting that sector of the public which deals directly with the production and marketing of fish. These projects are aimed at selling the cooperative idea to these influential gr people so that their support may be de upon on whatever plans the governmen introduce in the future.

The observation-trip, although a undertaking where expenses were met common fund contributed by each parti had the sanction of the Philippine Cove and negotiations were made on a governm government level.

18. 3 Available Background Information, R tions, etc. on Fishery Cooperatives

In the preparation of the forthi Training Center in Fishery Cooperativ Administration, FAO was supplied with ground information, publications, etc. on cooperatives of the Philippines.

18. 4 Fishermen's Cooperative and Credi Facilities

Information regarding fisherme operatives were sent to FAO in answ questionnaire received by this Office prio opening of and in connection with the T Center in Fishery Cooperatives and Adm tion held in Australia.

Information on credit facilities forwarded to the Chairman, Panel C, Te Committee II upon completion of report f pertinent offices of the Philippine Gover

19. REPORT ON GOVERNMENT CREDIT FACILITIES FOR FISHING INDUSTRIES IN THE INDO-PACIFIC REGION

mong the resolutions adopted at the
n Session of the Indo-Pacific Fisheries
in Bandung, Indonesia, in 1957, was one
to credit facilities for fishermen in the
It was recommended specifically that
l survey of these facilities be undertaken
the inter-session period "with special
ce to the present forms of credit, the
interest or return, the forms and extent
ities required as well as the effectiveness
existing credit facilities".

n order to facilitate the collection of
t information, copies of the attached
on "Government Credit Facilities for
Industries" with a request to supply
information under the specific items in
line were circulated to the members of
cal Committee II, Panel C, by the
cal Secretary (Attachment II).

nformation on the specific items of the
was received from the following coun-
Australia, Ceylon, Hong Kong, Indonesia,
n, the Philippines and Thailand. In
n, information of a fragmentary nature
de available by India.

The report presented below is based on
ition provided by the above countries
nented by data available from other
. Naturally, since the survey was
d to government facilities, it does not
a complete picture of credit operations.
e countries commercial banking institu-
d non-institutional lenders are of substan-
portance as credit sources. In Japan, for
e, cooperative credit is well developed
onsiderable amount of loans are made to
en by the cooperative banking system
ed of the Central Bank for Agriculture
restry, the prefectural credit federations
ry cooperative associations, and the loan
ons of the cooperative societies them-
It is hoped that the information provided
r government facilities can eventually be
ed to include commercial and non-insti-
l credit to make possible an overall
al of the credit situation. Before one
ceed to this task it will be necessary to
te the information on government facilities and for this reason, those countries which have not already complied with the Technical Secretary's request for information are requested to do so within the near future. Upon receipt of the additional information, this report will be revised and a comprehensive account of government credit in the fisheries prepared.

19. 1 Legislation

Among the countries on which information is available only the Philippines, some of the States in the Australian Federation, Indonesia and Japan have some form of legislation pertaining to the organization of Government credit institutions and/or to the provision of specific financial assistance by the Government.

In the Philippines, ACCFA*, a Government financed institution for the extension of loans to cooperatives including fishermen's cooperative associations, was established by an Act in 1952. The Philippine National Bank which is partly and the Development Bank of the Philippines which is totally financed by the Government, and which were chartered by special Government Acts, can also provide loans to fishermen.

In Australia, the Commonwealth Government under the "Fishing Industry Act, 1956" has established the "Fisheries Development Trust Account" from which loans to fishermen can be made. The "Government Guarantees Act, 1934—43" and the "Fisheries and Oyster Farms Act, 1935—1957" in New South Wales, the "Loans to Producers Act" in South Australia, and the "Industries Assistance Act" in Western Australia, are legislative measures under the terms of which financial assistance to the fishing industry by the State Government or by Government financed banking institutions can be rendered.

The Farmers and Fishermen's Bank in Indonesia was established by the Emergency Act of August, 1957, and in August, 1958, an Act on the Farmers and Fishermen's Bank was sponsored by the Government and the Parliament, replacing the former Act.

* ACCFA (The Agricultural Credit and Cooperative Financing Administration)

In Japan, the Agriculture, Forestry and Fisheries Finance Corporation Law was established in 1952 to make Government funds available to the primary industries including fisheries. Besides this law, there are several additional acts under the provisions of which Government assistance to the fishing industry can be granted, e.g. funds to cover damages suffered from typhoons and other natural disasters and loans to small-scale fishermen on guarantees by certain financial bodies reinsured by the Government under the provisions of the "Medium and Small Fishermen Finance Guarantee Law".

Although financial assistance is made available to the fishermen in Ceylon, Hong Kong, Pakistan and Thailand, no specific legislation was reported for these countries.

19.2 Extent and Form of the Funds

In Hong Kong, there are three revolving funds two of which are administered by the FMO (Fish Marketing Organization), and one by the Department of Agriculture, Fisheries and Forestry. Under the FMO, a Revolving Loan Fund with a ceiling of HK $ 800,000 was established from the Organization's reserve funds. The other fund amounting to HK $ 31,000 donated by CARE has been loaned out for the specific purpose of assisting the shrimp fishermen. The revolving fund administered by the Department of Agriculture, Fisheries and Forsetry amounts to £50,000 (HK $ 798,000) which are intended for the mechanization of the inshore fishermen's vessels.

ACCFA of the Philippines administers revolving funds of $ 50 million (100 million pesos) which are used for loans to agricultural producers and fishermen.

Thailand reports that the revolving funds available for fishery loans amount to 5 million bahts.

The recently established "Farmers and Fishermen's Bank" in Indonesia is reported to have 100 million Rp. for loan purposes.

In Ceylon, a fund is voted annually by Parliament for the purpose of extending loans to the fishing industry. In 1957/58 provision was made up to a sum of Rs. 350,000/-.

In the Federation of Malaya, a revolving fund of M $ 3 million for loans to fishermen through their cooperative societies was approved in September, 1956. Priority in extending loans has been given to the east coast of Malaya a pilot fish marketing scheme has been c out.

19.3 Purposes for which Credit is Granted

19.31 Credit to Fishermen

Most government loans to fisherme extended for the purchase of gear and f acquisition or improvement of fishing cra engines.

The recently established "Farmer Fishermen's Bank" in Indonesia is repor have 100 million Rupiahs for loan purposes initial capital.

In Hong Kong, FMO provided loa fishermen for the purchase of craft and ge also for any other productive purpose, wh Department of Agriculture, Fisheries and try provides loans solely for the purcha installation of diesel engines and/or winch

In the Philippines, the Philippine Na Bank (P.N.B.) extends loans to fisherm the purchase of craft, gear and for ope expenses. The Development Bank of the P pines provides loans only for the constr of fish ponds. Though ACCFA has the to provide funds to fishermen according statute under which it was established, in p practice it extends loans only to fishe operatives and not to individual fishermen

In Japan, the total sum to be financ the Agriculture, Forestry and Fisheries F ing plan for fisheries in 1958 amounts to 4,600 million yen, of which 330 million financed for fishing ports, 3,500 million y fishing boats, 120 million yen for fish c industries 250 million yen for ice-makin refrigerating facilities and 290 million y synthetic fiber fishing nets. A gra increasing trend is seen year after year amount of loaning.

Provision of fishing requisites to fish on a loan basis is reported by Pakista Indonesia. In Pakistan, nylon twine, en and wood for building boats are suppli credit by the Government. In Indonesi Special Welfare Scheme of the Centra Fisheries Service provides fishing vesse engines to the fishermen on a hire-pu basis, while the Farmers and Fishermen's extends loans to fishermen for the purch

fish fry, craft, operating expenses and for fishery purposes.

Thailand provides loans for the purchase gines, gear and craft as well as for craft vement.

The Fish Board of Queensland (Australia) s *bona fide* fishermen with loans for purchase ft, engines, and gear. Financial assistance o reported by New South Wales, Victoria il Finance Corporation), Tasmania (Agri- al Bank), and South Australia (State for the purchase of boats and engines).

In Ceylon, loans are extended to fishermen ie purchase of gear (including materials e manufacture of gear) or for the purchase onstruction of craft and for the mechaniza- of wind propelled craft. Since August, a new scheme which provides for the sion of loans up to an amount of Rs.)/- for the purchase of mechanically lled boats, a reasonable amount of fishing and for the cost of the first year's insurance e boat, is in operation. Loans are also l for repairs to fishing gear and craft.

In Japan, loans to fishermen are extended ie Agriculture, Forestry and Fisheries cing Corporation for the purpose of purchas- r constructing craft, while the provision ns for operating expenses has been left to erative or other credit facilities. The ration also extends loans to small fishing for the purpose of purchasing fishing craft. ry cooperatives and their members, how- are given preferential treatment in the ng of loans.

It was reported that in the State of Bombay, loans for mechanization of fishing craft ther developmental purposes were granted iermen under "State-Aid to Small-Scale ottage Industries Rules, 1935, (as amended 28 February 1955)". Fishermen have to a group of 6 to 10 fishermen who must be ers of a local fishermen's cooperative society o fishing collectively to be eligible for loan s.

Credit to Processors, wholesalers and Retailers

There are comparatively few government ial assistance measures for processors, salers and retailers. Government resources evoted primarily to the furtherance of cooperative activities. No governmental credits to processors, wholesalers and retailers are reported for Hong Kong and Thailand.

In the Philippines, the P.N.B. extends loans for operating expenses to processors, wholesalers and retailers and also for the purchase of processing facilities, while the Development Bank of the Philippines (D.B.P.) extends loans for equipment for the preservation of fish and fish products.

The Pakistan Industrial Finance Corporation and the Agricultural Bank extend loans to companies for the construction of freezing units, cold storage, ice plants, fish meal plants, etc.

In Indonesia, the Farmers and Fishermen's Bank finances wholesalers and provides funds for assembly operations, for transport facilities, etc. Besides, several funds are also available for the same purpose. These funds are provided by the Institute of Credit Guarantee, and Cooperative Service of the Ministry of Trade.

In South Australia, the State Bank gives loans to approved companies for the improvement of processing facilities.

19.33 Credit to Cooperative Organizations

In Ceylon, loans are issued to fishery cooperatives for the acquisition or construction of craft and the acquisition or manufacture of gear. Loans are also issued for repairs of fishing craft and gear, for marketing operations and for subsistence expenses of members. In a few instances, loans have been issued, too, for the purchase of motor lorries and the construction of sheds for the storage of fishing gear.

In the Philippines, ACCFA at present extends credit only to cooperative organizations (FaCoMa-Farmers' Cooperative Marketing Association-and CCE-Central Cooperative Exchange). Facility loans to FaCoMa are used for the construction or purchase of facilities for handling, storage, processing or packing of fish or fish products. Mechanizing loans to both FaCoMa and CCE are used for the purchasing and processing of the catches of their members.

In Hong Kong, FMO extends loans to cooperatives for the construction of homes for their members as well as for the purchase of mechanized transport vessels.

In Japan, the Agriculture, Forestry and Fisheries Financing Corporation gives preference to co-operative associations in lending money for the construction of port facilities, fishing vessels and various facilities such as cold storage, ice and processing plants and for the purchase of synthetic fiber nets.

In the State of Bombay, India, financial assistance to fishermen's cooperative societies is given for establishment of ice and cold storage plants on the basis of one-third of the cost of the plant as subsidy and two-thirds on loan.

In the State of Madras, India, the Government provides the cooperative societies with mechanized boats and nylon nets at subsidized prices in the form of long term, interest free loans in kind. The subsidy on these goods ranges from 25 to 33⅓ per cent. Motor vans are also supplied on seven-years' credit, and long-term loans for the construction of godowns and curing sheds are provided by the Government to the societies on the basis of 50 per cent loans and 50 per cent subsidy.

Aside from the loans made directly to them, the cooperatives are often used for channeling government loans and assistance in kind to their member fishermen. This function is performed by cooperatives in Pakistan where gear and engines are imported by the Government and loaned to the fishermen and in Indonesia where vessels and engines are provided mostly to members of co-operatives, on a hire-purchase basis, by the Special Welfare Scheme of the Sea Fishery Service and in Japan.

19.4 Proportion of Total Funds Required Represented by the Loan

The proportion of total funds required represented by the loan varies from country to country and also according to the nature of the loan.

Factors considered are financial standing of the borrower, possibilities of borrowing from other sources, and the size of the funds at the disposal of the government lending institutions.

FMO in Hong Kong provides loans amounting to 80-90 percent of total funds required, the balance to be provided by the fishermen. In the case of loans made by the Department of Agriculture, Fisheries and Forestry, no fixed proportion is stipulated and each case is decided on its individual m It is said that applications are more favou received from those fishermen who are a put up more than 50 percent of the c required.

From Ceylon it is reported that in g the loans cover total cost.

In the Philippines, not more th percent of total funds required are provid ACCFA facility loans, but for facilities m steel or concrete, and also for fish conta 100 percent of cost can be advanced. I case of commodity loans, 80 percent of co provided. For loans made by the Phili National Bank and the Development Ba the Philippines, no fixed proportions reported. In general the amount of depends on the value of the collateral a loan can be made up to approximately 6 cent of appraised value.

In Thailand, the proportion of total required represented by the loan is 60 pe and in Indonesia, in the case of loans m the Farmers' and Fishermen's Bank, in of 75 percent.

In Japan, the Agriculture, Forestr Fisheries Financing Corporation normall vides 60 percent of total funds required, much as 80 percent can be provided to cooperatives for the purchase of fishing In most cases the minimum or maximum a per loan is established by law, in acco with the purpose for which the loan is m order to secure equitable distribution of and at the same time to make lending tions efficient.

In the State of Bombay, total cost engines is granted by the Government basis of 50 percent grant and 50 percen The rate of subsidy is reduced to ab percent if the engine purchased is of an sive nature or above 30 h.p.

19.5 Interest Rates

One of the important purposes of g ment credit facilities is to supply cre reasonable rates of interest to the in where institutional credit facilities are and high rates of interest are charged.

In Ceylon, 3 percent interest is c to individual fishermen, while 2 perc charged to registered co-operative societ

In Hong Kong, FMO charges 3 percent num on the loans issued to fishery co- ive, and 10 percent per annum on those to individual fishermen; while the interest n loans for the mechanization of fishing nade by the Department of Agriculture, ies and Forestry is 6 percent per annum.

In the Philippines, the Philippine National and the D.B.P. charge 6 percent per , with a rebate of 1 percent for the loans in time in the case of loans made by the . The interest on ACCFA loans differ ing to their purposes: 8 percent per for facility loans, 6 percent for com- loans, and 7 percent for merchandizing

Eight percent per annum is the interest n government loans in Thailand.

In Pakistan, the Government does not any interest. In Indonesia, interest re 12 percent per annum on both Institute Guarantee and Farmers and Fishermen's loans. The rates are relatively high, funds for these purposes have to be ed from other banking institutions. The ative Service of the Ministry of Trade s credit and loans on easier terms and nterest.

In Japan, the interest rates on the loans ed by the Agriculture, Forestry and ies Financing Corporation vary according purposes of the loans. Interest is 6.5 t on loans for building fishing port facili- 5 percent on loans for building processing es. In cases in which loans are extended air or reconstruction of facilities damaged ral disasters, interest rates are lowered percent.

In the State of Bombay, the interest d is 4½ percent per annum and a penalty lent to ½ percent is imposed in case of yment of principal and default of interest.

In the State of Madras, India, interest d on long term loans to cooperatives is 4¾ t; no interest is charged on the cost of ized boats and nylon nets.

Arrangements for Collateral and Require- nents Made of Beneficiaries

Fishermen who, as a rule, own few able assets find it difficult to furnish te collateral. In most instances, the security for the loans is the equipment purchased. In other instances, emphasis is on productive and repaying capacity of the borrower, particularly when, as in Hong Kong, the fishermen are required to deliver the catch to a central marketing organization (FMO in Hong Kong) which has adequate information on the credit standing of the fishermen and where effective arrangements for repayments of loans have been instituted.

Loans by the FMO in Hong Kong are issued to any fisherman who owns one or more fishing vessels. Size of loan depends on applicant's actual needs, his ability to repay, his standing with the organization and so forth. So far, only one loan extended for the purchase of trawlers has been secured by a mortgage and the usual arrangements for security are for the individual fishermen borrowers to provide one or more fishermen guarantors. In the case of borrowers being members of credit co-operative societies, the loans are guaranteed by the societies. When the FMO loan exceeds HK $ 1,000, the Director of Marketing is to be informed by the Department of Marine, should the borrower desire to have a transfer of ownership of his vessel recorded before the loan is fully repaid. Insurance arrangements are made only in special cases when specifically required by the Director of Marketing. Loans extended by the Department of Agriculture, Fisheries and Forestry do not have to be secured by mortgages but have to be guaranteed either by a cooperative or by two fishermen of good financial standing. The Director of Marine is informed that the Government has a financial interest in the boat and the Department of Agriculture, Fisheries and Forestry has to be notified if the fisherman borrower wants to register a change of ownership before the loan is fully repaid. The engine is supposed to be insured by the fisherman for the amount outstanding on his loan.

In the Philippines the criteria for the selection of beneficiaries, applied by the Philippine National Bank, are reported as follows:

(i) The moral reputation and credit standing of the applicant.
(ii) The liquidity and solvency of the applicant.
(iii) Assets offered as collateral.
(iv) Estimated income of the applicant.

Loans of the Development Bank of the Philippines are granted to those (a) who already own established fish ponds but want to improve them to increase production, and (b) who desire to engage in the fish pond business and have already secured from the Government a ten-year fish pond lease agreement covering the area they want to develop into fish ponds. As to collateral arrangements, mortgages on land, buildings and other fixed insurable assets are usually required by the P.N.B. and the D.B.P. while insured fishing vessels, engines and equipment, and stocks are also used as collateral. In the case of ACCFA loans, security is arranged as follows: facility loans are secured by mortgage on the facility, except in the case of loans for fish containers which are secured by a real estate mortgage or a chattel mortgage on a fishing boat. Merchandize loans are secured by chattel mortgages on assets of FaCoMa or CCE. Commodity loans are secured by the products stored by FaCoMa and the warehouse receipts are filed with ACCFA.

In Pakistan, only *bona fide* fishermen owning fishing boats can be given credit. Allocation committees have been organized to develop procedures for the distribution of credit. Two guarantors are needed for obtaining loans and the boat of the borrower is also mortgaged. At present, the loans are not insured.

In Thailand, the loan is secured by a first mortgage on boats.

In Indonesia, the Special Welfare Scheme of the Sea Fisheries Service extends loans on a hire-purchase basis, while in the case of loans by the Institute of Credit Guarantee, Farmers and Fishermens' Bank a mortgage or other collateral is required together with insurance arrangements.

In Japan, the common practice is to secure mortgages on facilities and fishing craft. Usually four guarantors are required for the loans on fishing craft.

In the State of Bombay loan recipients are required to furnish collateral security equal to double the amount loaned. The mortgage remains in force until the last instalment on the loan and all interest due have been repaid. Vessels for the purchase or construction of which loans have been granted must be insured and an assignment of the policies in favour of the Government must be executed.

In Ceylon, loans to cooperative so are issued on the basis of the borr estimated repaying capacity. Repaying ca is determined from the operational stat of the societies by further taking into a the estimated increase in income wh expected as a result of the purchase o equipment or as a result of the repairs m existing equipment. Loan applicatio scrutinized and investigated by the field s both the Fisheries Department and the Co tive Department. Craft and gear wh acquired, constructed or repaired is hy cated to the Cooperative Provincial Ban the case of loans issued to Fishermen operative Credit and Sales Societie individually owned craft or gear of the m acquired, constructed or repaired with t as hypothecated by the members to the s as security. Some of the recently reg fishermen's cooperatives are incorporate unlimited liability. Craft and gear belong societies and on which loans are issued a normally insured.

In the case of loans to individuals, the loan does not exceed Rs. 500/-, the c gear owned or acquired by the borro mortgaged to the Government and a p bond for repayment on time of the c furnished in addition. In the case of lo individuals of Rs. 500/- to Rs. 3,000/ borrower is required to mortgage craft c in addition to furnishing a personal bon two sureties for due repayment of the de the case of loans to individuals over Rs. the borrower is required to mortgage lan acceptable title to the Government as s for the repayment of the loan. Loans dividual fishermen for the financing of cr gear must be insured with an insurance pany approved by the Department. Un new loan scheme for the mechanizat fishing craft introduced in August, 19 other security is needed than the bo ownership of which is retained by the G ment under a hire-purchase agreement new scheme aims to make borrowing by men easier, since under previously e arrangements fishermen had to put up co in the form of immovable property for l excess of Rs. 3,000/-. The new sch intended to serve the dual purpose of pr credit as well as serving as propagan

ıized fishing. Persons to whom these re issued:

(a) must be skilled, industrious and enterprising fishermen who are not satisfied with earning an income just sufficient for subsistence, but are prepared to better their income by the use of new methods and hard work or, in the case of newcomers to the industry, they must be energetic and enterprising persons;

(b) must be sufficiently outstanding in the fishing community in providing the initial leadership and in furthering the program of mechanization in the fishing community.

Applications for these loans, too, are ed into and reported on by the field of the Fisheries Department.

Repayment Procedures

In Hong Kong FMO loans normally are tended for periods of over one year. er, an extension may be granted if ers encounter genuine hardships. In the f larger capital loans, the repayment may range from five to ten years. Repay- are made by deducting a certain per- e from the proceeds of sales of the er's fish through the FMO. The per- e deducted varies from 15 to 20 percent ordance with the borrower's ability to The by-laws of the association and the reement stipulate the deductions applica- case of loans to fishermen's cooperatives eir members. In the case of loans made Department of Agriculture, Fisheries orestry, the duration of the repayment is two years, but again extensions are l in cases of genuine hardships. Deduc- 25 percent of the value of fish sold by rrower through the FMO is made on of the Department of Agriculture, es and Forestry.

In Ceylon, terms of loans are as follows:

(a) Acquisition of a mechanically propelled boat under the new scheme.....5 years

(b) Purchase or acquisition of craft.....3 years

(c) Mechanization of craft.....3 years

(d) Purchase or manufacture of fishing gear.....2 years (Under the scheme of loans to individual fishermen loans for the purchase or manufacture of fishing gear are repayable in one year)

(e) Repairs to craft or gear.....1 year

(f) Marketing and subsistence....1 year

(g) Other equipment, e.g. equipment for the processing of beche-de-mer.....1 year

(h) Sheds.....1 year

(i) Motor lorry.....5 years

Payments are made in monthly instalments. Payments are normally received during the months of the fishing season which may extend over 4, 6, 10 or 12 months. In the case of cooperative societies, collections are made through the Cooperative Provincial Banks. In the case of individual fishermen, collections are made through the Department's field staff.

In the Philippines, duration or repayment period varies from case to case. Short-term loans made by the P.N.B. are for a period of 120 days to one year, while long-term industrial loans are for a period of 5 to 10 years. In the case of the D.B.P. loans which are usually for long-term the repayment period is 5 to 10 years. On ACCFA facility loans the repayment period is 10 years for fixed facilities, 5 years for semi-permanent facilities, 3 to 5 years for movable facilities and one year for fish containers. As to the timing of repayment of the ACCFA loans, the Government policy is to have the loan repayments adjusted to the borrower's capacity to pay from the sales of his products.

In Pakistan, the repayment periods are 2 to 3 years for nylon twine, and 3 to 5 years for marine Diesel engine loans. Repayment is made monthly but recoveries are not effected during the monsoon period (June, July, August). The fishing requisites and equipment loaned are distributed through the fishermen's cooperative societies concerned and collections, too, are effected through the societies. In case of any difficulties encountered in the repayment of instalments, the fishermen's cooperative societies are helped by the Department of Fisheries and the Registrar of Cooperative

Societies, who is also empowered to proceed against defaulters. No defaults on loans have been reported as yet.

In the State of Bombay, the repayment of loans commences three months after the loans are made. The loans are repayable in equal monthly instalments over a period of five years, each instalment being payable in the first week of each month. No repayments are required during the monsoon season from June through September.

In Thailand, the repayment period is two years and the payments are made every three months, either directly to the Department of Fisheries or to the Provincial Fisheries Officers.

In Indonesia, in the case of the In of Credit Guarantee, long-term loans are to six years and loans for operating ex for three years. In the case of the S Welfare Scheme of the Sea Fishery Servi payments are collected by the coop organizations, should the borrower bel one of those organizations. The Farme Fishermen's Bank at present extends only term loans (for one year or shorter) places where fish auctions are held th ments are deducted from the proceeds sale of the borrower's fish.

ATTACHMENT I.

APANESE BIBLIOGRAPHY ON FISH FLOUR FOR HUMAN CONSUMPTION

by

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Attached to this Bibliography is a copy of Recommendations of Fish Processing Technology, tion of Fish Flour, as contained in the Interim Report of the Council of Food and on for the Nation, Economic Stabilization Board, Japan, 23 May 1947)

A. *Processing Techniques of Fish Flour for Human Consumption*

efining fish flour by solvent extraction.

a) Hot alcohol extraction for removal of offensive flavor and odor:

(i) Tokuyama, S. (1930). Japanese Patent No. 87,847. This method has the advantage of removing both water and fat. High cost of extraction is a serious disadvantage.

(ii) Hoshino, S. and Higashi, H. Japanese Patent No. 97,398. A method using alcohol in combination with other organic solvents.

b) Cold extraction with solvent such as gasoline or benzene.

(i) Kato, N. (1935). Japanese Patent No. 112,993.

(ii) Kato, N. (1936). Japanese Patent No. 115,730, 116,546 and 117,357.

(iii) Yamamoto, S. and E. Narita (1941). An experimental preparation of the powdered fish of the old-free-sardines for cooking. *Fishery Investigation, Imp. Fish. Exp. Stn.*, **8:** 55-56.

c) Purification by NH_3.

(i) Higashi, H. (1943). Japanese Patent No. 154,593. NH_3 gas is passed through the flour; the material is stirred with 5 times its weight of hot water; the extract removed; the residue is refined fish flour. Although this method is not so perfect as the above two in extraction, most of the disagreeable taste can be readily removed with less expensive arrangements.

(ii) Nagata, K. (1931). Japanese Patent No. 92,431. A method similar to (c) (i) but uses sodium carbonate instead of NH_3 gas.

(2) Method using malted rice for removal of offensive odor.

(i) Mechizuki, O. (1927). Japanese Patent No. 79,588.

(ii) Shoji, S. (1946). Japanese Patent No. 172,083.

(3) Oxidation for bleaching, deodorizing and sterilizing.

(i) Fujii, T. (1930). Studies on the utilization of hydrogen peroxide. *Nippon Jozo Kyokai Zasshi*, **33:** 1118-1119.

(ii) Mochizuki, O. (1927). Japanese Patent No. 74,887.

(iii) Oshima, K. and T. Sugawara (1936). On the artificial oxidation of oil in fish meal. *J. Fish.*, **39:** 1-12.

(4) Prevention of rancidity with antioxidants.

(i) Kimura, K. and S. Oya (1939). Processing method of antioxidizing fish meal. Japanese Patent (Publ.) No. 4,932.

(ii) Oya, T., T. Ando and Y. Usui (1939). Studies on the sardine meal-IX. Antioxidation of fish oil with wood-tar. *Bull. Jap. Soc. Sci. Fish.*, **7** : 217-219.

(5) Fish meal which can be reconstituted as fresh fish.

(i) Tamaru, S. (1928). Japanese Patent No. 76,628.

(ii) Hirano, H. (1939) On the gelation of fish (A preliminary report). *Bull. Jap. Soc. Sci. Fish.*, **8**: 29-40.

(iii) ————(1942). Studies on powder of raw fish. *J. Imp. Fish. Exp. Stat.*, No. **12** : 53-91.

Describes method for production of fish flour which, upon adding water, is converted to more or less fresh state. However, this type of fish flour cannot be preserved for a month or more, even when it is perfectly dry.

B. *Processing Technique of Food with Fish Meal as Material.*

(1) Preparation of "furikake" and "dembu".

No specific scientific references are available (IPFC/C58/WP 6).

(2) Baby food formula prepared from fish flour.

Standard prescribed by the Japanese Association for Baby Food and Nutrition is as follows :

Formula A		*Formula B*	
Soybean	50%	Starch	7
Corn starch	41%	Casein	1
Fish flour	8%	Fish flour	2
Salt	1%		

(3) Mixture of fish flour and potatoes or

(i) Higashi, H., S. Masuda, and E. (1947). Japanese Patent No. 1

Refined fish meal (ca. 10%) is with starch and heated unt The starch content is change alpha-starch. Upon adding the powdered product, pres for a length of time, becomes and it good to eat.

(4) Fish meal paste.

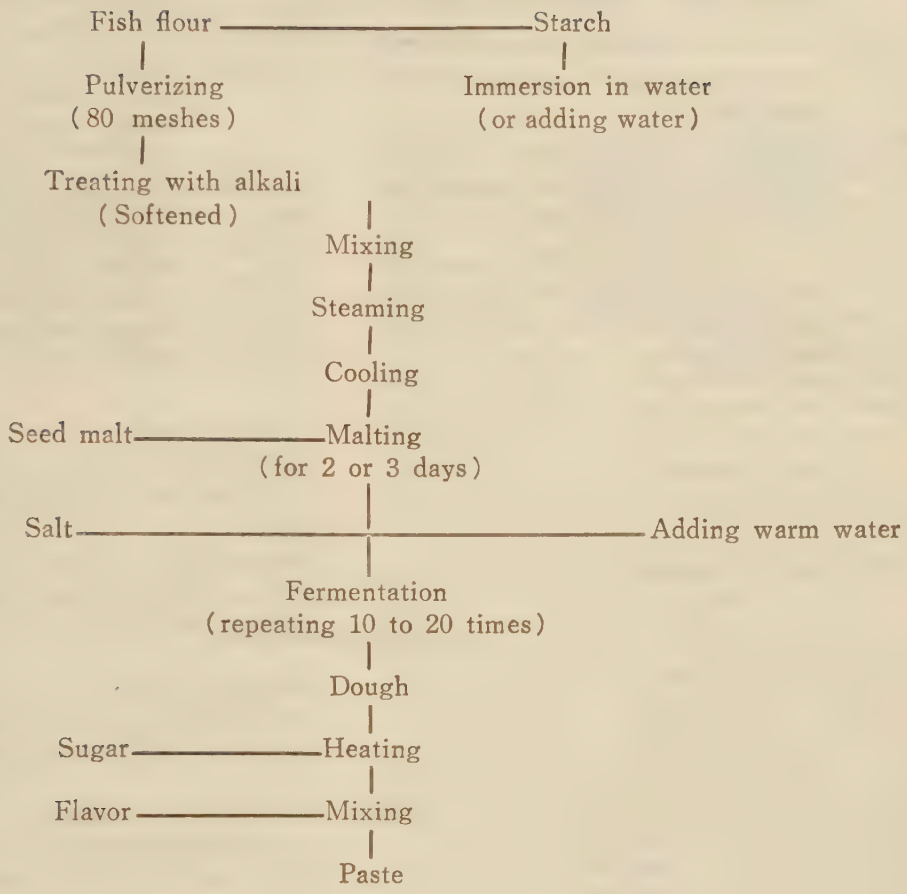
(i) Higashi, H. and T. Nitta Japanese Patent No. 179,040.

(ii) ————————, K. Nagaku S. Umemoto (1952). Studies utilization of fish meal fo *Bull. Jap. Soc. Sci. Fish.*, **17** ; 1

(iii) Nitta, T., Y. Inui and M. (1948). The discrimination meal paste and soy bean *Bull. Jap. Soc. Sci. Fish.*, **13** : 2

During the War, fish meal pa produced for use on bread s utilize a large amount of fish

Flow Sheet



Ingredient (%) of Fish Flour Paste

	Paste A	*Paste B*
Fish flour	23.0	17.8
Starch	23.0	17.8
Salt	14.0	5.9
Water	35.0	16.5
Sugar	5.0	42 0

ocessing fish flour into amino acid or ino acid source. Amino acid source epared from flour was used as a sub-tute for soy bean preparation.

atsumoto, K. and M. Nomura. Experi-ent of producing a soy bean source bstitute from fish meal. *Jozo Shikenjo koku*, 128 : 297-308.

C. *Nutritive Values of Fish Meal and Products thereof.*

(i) Nakae, T. (1939). Fish meal for food-II. Protein of sardine meal *Jozogaku Zassi*, **17** : 184-191.

(ii) ———— (1959). ———— -III. Decomposition of sardine meal by hydrochloric acid. *Ibid.*, **17**: 234-237.

(iii) ——— (1939). ——— -V. Method of decomposition of sardine meal by HCI. *Ibid.*. **17** : 701-708.

(iv) ——— (1940). ——— -VI. N-compounds in extract from sardine. *Ibid.*, **18** : 29-35.

(v) Nakae, T. (1940). Fish meal for food-VII. Extraction of protein from fresh sardine. *Ibid.*, **18** : 36-44.

(vi) ——— (1940). Fish meal for food-VIII. Precipitation of protein from extracts of fresh sardine. *Ibid.*, **18** : 504-16.

(vii) Nakanishi, T. (1939). Fish m food-IV. Analysis of sardine protein and its decompositi HCI. *Ibid.*, **17** : 393-399.

(viii) Takada, R. (1938). Fish me food-I. Nutritive value of pro sardine meal. *Ibid.*, **16** : 768-7

(ix) Tokuyama, S. (1936). Stud the new utilization on marine I. Feeding experiments of anin exclusive diets of bread and containing the alcohol-extracte flour. *Bull. Inst. Phys. Chem. R* 818-846.

INTERIM REPORT OF THE COUNCIL OF FOOD AND NUTRITION FOR THE NATION

ECONOMIC STABILIZATION BOARD. JAPAN

RECOMMENDATION ON FISH PROCESSING TECHNOLOGY

23 May 1947

Production of Fish Flour

1) Fish caught abundantly should be or this purpose it is recommended that should be processed as much as possible flour. The term fish flour is used to wder made from fish which is suitable nan consumption. Unless otherwise , the standard of fish flour is tentatively ed below :

i) Protien.....more than 59%
i) Crude fat..... less than 10%
i) Water content..... less than 10%

r, the product which is prepared rring, Atka mackerel or arrow-toothed hould contain at least 56% protien, less % crude fat and no alien substance such

2) Fish cake so far used for animal should be refined and processed into r or any other form of food for human tion.

3) In order to improve the quality of r and thereby to promote human con- n of the product, the following steps e taken.

A. To ensure freshness of raw material, mobile processing facilities, such as fish flour factory ship or train should be provided. By-products from fish flour such as boiled juice and fish oil should be thoroughly utilized. For this purpose model plants will be established at important fishery centers in the country.

B. Rational use of fish flour should be encouraged.

(a) in introducing fish flour into the human diet, it would be more suitable to process the flour into some product rather than to supply it as it is ;

(b) processing of fish flour into paste or some other seasoning should be encouraged ;

(c) in addition, specially refined fish flour should be used in the formulae for baby food.

C. Research into processing techniques for fish flour should be encouraged so as to improve the quality. This may include studies on smoke curing of the flour and production of reversible fish flour which can be easily converted into fresh state.

D. Attention should be paid to minimize production cost of fish flour so as to make it as cheap as possible.

ATTACHMENT II.

OUTLINE ON
GOVERNMENT CREDIT FACILITIES FOR FISHING INDUSTRIES

1. **Legislation.**
   - 1.1 Legal enactments under which credit facilities may be made available to fisheries. (Attach copies if possible).
   - 1.2 Extent and form in which funds made available, eg. revolving fund, annual subvention, etc.
2. **Administering Authorities.**
   - 2.1 Central authority eg. Government Department, Development Authority or Agency, Finance Corporation, Special Bank, Loan Board, etc.
   - 2.2 Provincial, State or local authorities which may be concerned with administration of credit facilities.
   - 2.3 Cooperative organizations which may be involved and nature of their responsibilities.
3. **Purpose of Credit Facilities: to assist:**
   - 3.1 Fishermen.
     - 3.11 For purchase of gear.
     - 3.12 For acquisition or improvement of craft.
     - 3.13 For any other purposes.
   - 3.2 Merchants, processors and retailers.
     - 3.21 For facilities eg. storage, processing, transport, containers, business premises.
     - 3.22 For any other purposes.
   - 3.3 Cooperative organizations.
     - 3.31 For acquisition of facilities.
     - 3.32 For operating expenses.
     - 3.33 For any other purposes.
4. **Nature of Assistance Provided in Mentioned Above.**
   - 4.1 proportion of total cost represe the loan.
   - 4.2 Any grants which may be inclu
   - 4.3 Interest rates.
   - 4.4 Security arrangements:
     - 4.41 Under Hire Purchase ments.
     - 4.42 By mortgage.
     - 4.43 By other collateral.
     - 4.44 Insurance arrangements
5. **Repayment Procedures.**
   - 5.1 Duration of repayment periods
   - 5.2 Timing of payments.
   - 5.3 Collection arrangements.
6. Criteria and Procedures for the Sele Beneficiaries.
7. Review of progress achieved so far, ing some account of services, facilit equipment acquired through gove credit arrangements, in relation to requirements.
8. Outstanding problems and any sugg as to action which might usefully b by IPFC in this connection.

CHAPTER 4. PUBLICATIONS

cil Proceedings

) The Council instructed the Secreta- ake appropriate action to ensure the and distribution of the Proceedings of h Session as expeditiously as possible.

) The Council approved for publica- ull, Technical Papers Nos. 1, 3, 4, 5, .2, 16, 17, 19, 21, 23, 24. The Secretary ucted to transmit Technical Paper No. O Fisheries Division with the request night be edited by the appropriate and returned to the Secretariat for on in full.

chnical Papers 6 and 7 were to be l in full if the complete manuscript was ilable, otherwise these Papers together s. 2 and 10 should be published in It was recommended that Working o. 5 and Technical Papers 25 and 26 published in the *Current Affairs Bulle-* Technical Paper No. 14 should be ted in the report on the Status of the that Technical Paper No. 13 should be o the Ceylon Fisheries Research Sta- publication in their Bulletin, and that l Papers 15, 18 and 20 should be to the authors. The Council instructed tary to issue, in the Occasional Papers ntributed Publications Nos. 8, 20 and g translations of papers originally in the Indonesian language and with restricted distribution. The Council d it desirable for the Secretariat to take obtain translations of the papers on subjects published in the Region in s other than French and English and to he distribution of such translations in cil's Occasional Papers series.

h Session Symposium

llowing discussion on the question of on of the Symposium Papers, the Coun- ed on a basis of the recommendation Delegate for U.K., supported by the for India, that the Symposium material ded to Dr. G.L. Kesteven on a basis of nd paragraph of his letter dated 4th r, 1958.

The Council confirmed a proposal by the Delegate for U.S.A. that this action should be taken on the understanding that the Symposium material should be published in time for distribution with the other sections of the published proceedings of the Council and that if this was not possible, the Secretariat was instructed to undertake publication of the Symposium Papers which had been presented to the Council during the Symposium Meetings.

It was emphasized that the Council attached considerable importance to the publication and distribution of this section of the proceedings simultaneously with the distribution of the other sections of the proceedings.

3. Current Affairs Bulletin

In order to ensure a steady flow of material for the *IPFC Current Affairs Bulletin*, the Council recommended to the Member Governments to make available as routine matter to the editor their periodic reports on scientific and technical activities in fisheries.

In this connection, the Member Governments might like to consider the desirability of assigning a liaison officer through whom the IPFC will obtain material for the Bulletin. This officer will assemble material in that particular country and send it to the editor of the Bulletin as and when it becomes available. It will be understood that this arrangement is in no way to effect the status of the Administrative Correspondent who will under all circumstances be the means of contact on matters of policy involving the Council and the Government concerned.

The Council was of the opinion that its activities through its Technical Committees would receive added impetus if the nominees to these Committees would make available lists of the scientific workers and administrators active in the various fields of fisheries, and that the Secretariat should work in close liaison with FAO Fisheries Division in connection with the Division's permanent register of such people.

Country lists received from Committee members should be published in the *Current Affairs Bulletin* and where appropriate, the Technical Secretaries would take steps to keep these workers informed of the various measures taken to implement Council recommendations.

4. **Reference Books**

Notwithstanding the statement to the contrary given in the Summary Report of the Seventh Session, the Council placed on record its unanimous belief that, in order to avoid confusion, reference books containing compilations of methods should be termed "Manuals", whereas the term "Hand-books" should be applied to volumes containing compilations of results and/or tabulations of data. Further it was agreed that compilations of these two might be referred to as "Reference Books".

The Council noted with pleasure the progress being made by FAO in the preparation of these books of reference and drew atte the particular suggestions submitted by cal Committee I and contained in Chapt this record.

The Council gave consideration question of publication of checklists of fis urged Member Governments who have compiled or published lists or have revis earlier lists, to provide Biology Branch, FA eries Division with such lists or revisions. the Council requested Fisheries Divisio to publish, as least in draft form, a c which should include the names of all c cially important aquatic animals, before th Session.

ining Centers.

(i) The Council noted with pleasure s request that FAO should arrange a g center for technical officers had been ented by the establishment of the Inter- l Training Center on Methodology and ques of research on Mackerel *(Rastrelli-* he report of which was presented to the l.

The Council noted that certain recom- ions arising from this Training Center are ton by FAO and expressed the hope that ill be able to undertake this work.

The Council noted that the Training would have benefited by the participation ntists from countries fishing for Mackerels han *Rastrelliger* and believes that the need ise for further opportunities of reviewing ss in this work.

The Council recommended that Member ies and FAO should explore ways and by which research workers, including at ome of the participants at the recent , could meet in about three years' time to e the results obtained from the application recommendations from the Center and ted that such a Meeting should be ted as a workshop at which results would pared and analysed further if necessary.

(ii) The Council agreed that the forth- Training Center in Fishery Statistics, to l in Bombay early in 1959, would help to he requirements of the Seventh Session nendation for the development of suitable ng techniques for the collection of fishery cs in the Region, and therefore, recom- d that Member Governments take full age of this Training Center.

(iii) The Council expressed the view Fisheries Survey Training Center for ies of the Region was desirable and nended that the Center should deal with rmulation of coordinated programs for es development. The Council recommen- at participants at this Training Center be fisheries officers directly concerned he planning of fisheries development pro- in their respective countries.

(iv) The Council expressed its appreciation to FAO for the successful completion of the International Training Center on Fisheries Cooperatives and Administration held in Australia and recommended that Member Governments should take steps to make full and effective use of the services of the participants to the Center in furthering fisheries cooperative activities in their countries.

(v) The Council expressed the view that there was some need to review the present system of organizing Training Centers, and that except in relation to scientific subjects, the needs of the Region may sometimes be more effectively served by National Training Programs assisted where appropriate by services provided by other aid-giving agencies. The Council also requested the aid-giving Agencies to consider the desirability of organizing Sub-regional Training Centers for groups of 3 or 4 countries with one common language and having similar problems of fisheries.

The Council was of the opinion that international Special Training Centers could be an effective tool in expeditiously defining the salient features of the fisheries industry in this region. It was recommended that participants in such Special Training Centers should be experienced fishery officials actively connected with the field to which a particular Special Training Center may devote itself and that the participants should go to the Center prepared with all available background information, research results and experiences in the implementation of development programs. It was further recommended that arising out of the exchange of views and ideas at such a Center suitable measures would be recommended for remedying the defects in the industry and for effecting a general improvement.

(vi) The Council reviewed its recommendation made at its Seventh Session to FAO for organizing a Regional Training Center in Fish Processing and Preservation. Considering the economic and dietetic importance of cured fish in the Region and further considering the present needs of the fish curing industry for expeditious improvement, the Council agreed that it would be desirable for the proposed Training Center to limit itself to Fish Curing in Humid Tropics with special reference to the

Indo-Pacific Region, instead of covering the wide field processing and preservation. The Council suggested that this Training Center should primarily aim at defining as precisely as possible, the defects in the fish curing industry and in suggesting suitable remedial measures.

The Council recommended that participants to this Training Center should be selected from those fishery officials in the member countries who are actively engaged in research in fish curing and in the administration of the fish curing industry. The Member Governments were requested to send, where possible, two participants, one from the field of research and the other from administration.

In preparation for this Training Center, Member Governments should compile all available information.

(a) for the preparation of as complete an account as is possible of the fish curing industry, furnishing information, among other factors, on manpower, plants and equipment, capital investment, quantity of raw material utilized, processing methods, varieties and quantities of final products, methods of handling, storage and packaging, consumer preference for various products, price of these products as compared to those of other protein foods;

(b) an account of research so far conducted in the various aspects of the fish curing industry; and

(c) an account of the measures so far implemented and/or contemplated for improving the fish curing industry.

2. **Aid-giving Agencies**

The Council reviewed the account of FAO fisheries activities in this region and expressed its appreciation of the assistance rendered.

The Council did not have for exam any records or activities of other aid Agencies, namely, Colombo Plan Auth USOM, and the Indo-Norwegian Foun which have been active in this region Council would be pleased to receive periodic reports if these could be made av

Arising out of the discussions aspect, the Council felt that there was a need for coordination of activities of the aid-giving Agencies. The Council sug that these Agencies might consider the bility of regional meetings of their repr tives for an exchange of ideas and vi order to ensure the most effective utiliz the assistance that might be available.

The Council was strongly of th that considerable time and funds of the buting Agencies as well as the re countries should be saved if prior to lau any extensive technical assistance pr an independent survey of the biological, logical and particularly the economic asp the industry is organized jointly by the concerned, and the nature and extent assistance are based on the findings re from such a survey.

3. **Expert Assistance**

In respect of expert assistanc Council felt that there was a need fo examination of the requests for such ass in the light of the national program and for development as well as of the f available in the recipient countries effective utilization of such assistanc Council further felt that it might be d for the contributing Agency to indic requirements of local facilities in th of counterpart or understudy, transp laboratory, equipment, literature as counterpart funds. The assistance normally be made available only wh concerned contributing Agency is satisf such requirements as are indicated by available.

CHAPTER 6. RECOMMENDATIONS

An attempt has been made to consolidate, chapter, the Recommendations adopted Council during the 8th Session. These nendations are grouped according to r they are addressed to Member Govern- FAO, the Executive Committee and ariat or the Technical Committees. The nendations as presented here, have been d of unessential phrasing.

A. TO MEMBER GOVERNMENTS

uncil Procedure

(i) The Council decided that in view FAO program for expanding the ge and distribution of the *Current raphy of Fisheries and Aquatic Sciences*, was no necessity for the Council to ue its bibliographic activities in the field eries biology, marine science and fisheries logy after the meeting of the Ninth n, and that no further nominations of graphic Correspondents would be sought.

(ii) The Council recommended that, at ext Conference of the FAO, Member ments might request FAO to make a e appropriation in respect of IPFC publi- s and that the members of the Council be advised of FAO's decision as early sible before the next Plenary Session of istence of such an appropriation. The il in Plenary Session should then decide ies of publication in respect of Council ents.

(iii) The Council adopted an amend- o the Agreement to permit the Council's y Sessions to be held at intervals of two The voting was as follows: 11 delega- in favour; 1 against, with two com- itions in favor received in writing by the ariat; 3 countries abstained from com- ting their opinions to the Council. The es in favor of the amendment gave the ed majority.

(iv) The Delegate for the Netherlands a proposed amendment of the Agreement would permit future amendments of the nent to be passed on a basis of a two- majority of Member Governments re- ted at a Session. The Secretary was instructed to circularize Member Governments on this matter.

(v) The Council recommended that Member Governments should include in their official Opening Statements a list of the important problems, given in the order of priority that each country would like to see assigned to them by the Council; that these Opening Statements should be transmitted to the Secretariat at least 60 days before the forthcoming Council Session; that the programme of work of the Technical Committees should be based on these lists of problems together with the recommendations from the previous Session and that provisional programs including these two features should be submitted to the Council in Plenary Session.

(vi) The Council resolved that in view of the fact that much of the Council's work is of a continuing nature, it is felt desirable that delegations from Member Governments should include at least one member who has had previous experience in Council Sessions. Member Governments are accordingly requested to give consideration to this matter when the question of appointing delegations to attend Council Plenary Sessions or Technical Meetings is under review.

The Council recommended that the proposal for inter session meetings should be forwarded to Member Governments of the Council with indication of the administrative and financial implications. The Council requested that the views of Member Governments should be presented at the 9th Session of the Council.

The Council placed particular emphasis on the need for continuity of representation and strongly urged Member Governments to give serious consideration to the two proposals set out in Chapter 1, para 82 and 86.

The Council recommended that Delegates on returning to their respective countries, should emphasize particularly one or more of the Council's recommendation which they consider would be implemented by their Governments and they should particularly seek authorization and means to implement these selected recommendations.

2. **Indo-Pacific Fisheries Year**

The Council decided that the concept of a "particular year" be dropped from consideration, and the problem referred to the new Special Sub-Committee on Statistics. In so doing, the Council expressed its adherence to the basic philosophy of the Indo-Pacific Fisheries Year, namely, that the collection of adequate statistics is an urgent matter, and should be pursued with all possible speed by Member Governments.

3. **Age Determination of Fish**

The Council hoped that member nations will report results in this area as their research on age determination of fish is completed.

4. **Standardization of Plankton Nets**

The Council recommends that Marutoku B-type nets be used during the period between the 8th and 9th Sessions of the Council to conduct experiments designed to obtain comparative data regarding the effectiveness of different kinds of plankton nets in catching zooplankton organisms, fish eggs and also fish larvae. The results of such experiments should be reported to the 9th Session, at which time the next step in standardization of sampling gear should be discussed. The mode of conducting the experiments and a schedule of the minimum results required are given in Annex 2 of Chapter 2.

Member countries, such as the Philippines and U.S.A., who are already in possession of comparative data, are requested to submit an analysis of them to the 9th Session of the Council.

5. **Identification of fish and plankton**

The Council urged members who have either not published lists so far, or have revised their earlier lists to submit copies to the Biology Branch, Fisheries Division, FAO.

6. **Population Dynamics**

The Council noted progress in population studies reported by some member countries, all of which are requested to continue to inform the Council of their work on fishing and stock assessments, and particularly with regard to river populations and cultivated stocks.

7. **Fish Culture in General**

The Council stressed the importa fish culture research in the region and mends that Member Governments be as consider how the work of the Council be made more effective in this field an proposals in this respect for considera the 9th Session of the Council.

8. **Soil Composition in Fish Ponds**

The Council urges that India co its work in this field and requests th results obtained, together with infor about techniques used, be reported to Session of the Council.

9. **Introduction of Non-Indigenous Fish**

The Council recommends to Governments that:

i. considerable research sho carried out before any leg in respect of introduction indigenous species of fish is e

ii. research on *Tilapia mos* should be continued, both ponds and natural bodies o and the results reported to t Council Session.

iii. where possible research sh undertaken on common *(Cyprinus carpio)* with pa attention to specification varieties dealt with and th tries from which they orig with the aim of finding cri determine which variety suitable for particular habita results should be reported next Council Session.

iv. research should be continue spawning of Chinese Car special reference to the pro of their fry.

10. **Weed Control**

The Council recommends that work be carried out to evolve a suita economic method of controlling growth o in fish ponds. Interested Member Gove may study further or examine whether t carp *(Ctenopharyngodon idellus)* would b in keeping down the growth of su aquatic weeds in their countries.

Member Governments are requested to ıe to report to the Council the results r work in this field until such time as uncil considers the time is appropriate urther general review of the matter.

utrition of Fish under Cultivation

Papers on nutritive value of natural and al foods and quantities eaten by cultivated e solicited for the 9th Session of the l.

hanos

Member Governments are requested to reports on new developments in *Chanos* s to the 9th Session of the Council. It cided, however, to suspend the activities Chanos Sub-committee pending promul- by the Council of a plan of action with to the broad problems of fish culture, gested under that general heading in port.

iver Basin Development

The Council recommends that Member ıments be apprised of the importance of oblem. Surveys should be carried out ice being given of impending construc- dams, and the sites should be cleared water is allowed to accumulate, in order ilitate subsequent exploitation of the ir. The Council stressed the need for uing biological surveys after the comple- the project. Legislation should in each e enacted to ensure that such surveys are l out, that their costs are borne by the pment Authority and that recommenda- arising from them are given due and consideration. The results of such s should provide the basis of action by vernment Agency concerned, designed tect existing fisheries or develop new The attention of Governments and ational Agencies concerned is drawn for le, to this need with respect to the Mekong Basin Development Project, will affect the fisheries of four countries.

Vater Pollution

The Council recommends that Member ıments be urged to take early steps to legislative measures to protect the interests fisheries well in time.

15. **Hilsa**

The Council proposed that Burma might reconsider setting up a research unit at an early date.

It is proposed that the Hilsa Sub-Committee should continue its work along the lines laid down at previous Council Sessions.

16. **Rastrelliger**

It is recommended that member countries fishing for *Rastrelliger* implement without delay the proposals contained therein for standard techniques of research on *Rastrelliger*. The Council noted that these proposals are entirely consistent with Article III of the Council Agreement.

All member countries, and especially those having important fisheries or conducting research on Mackerels, are requested to study the more general recommendation (other than those dealing with subjects covered by separate proposals in this report) contained in the report of the Training Center and report on the feasibility of their implementation to the 9th Session of the Council.

Particular attention is drawn to the proposal that participating countries should send records of their length sampling operations to the Council's Secretariat for compilation and publication in suitable manner. The form given in the Training Center Report should be used for this purpose.

17. **Mugil**

The Council noted with considerable interest the early results of experiments on artificial breeding of *Mugil* in Korea and solicits further reports at the 9th Session.

18. **Study of Basic Productivity**

The Council recommends that Member Governments having facilities and staff available at present for this work continue it and report their progress at the 9th Council Meeting, in particular those aspects which bear on the problems of standardizing the method for routine use.

19. **Tuna**

The Council recommends that Member countries continue to report to the Council new developments in the status of tuna fisheries and research, and reaffirms its recommendation

that the one-degree square should be the basic unit for the collection and presentation of tuna catch statistics.

20. **Beach Landing Craft**

An account of the work done by FAO in India and Ceylon on the development of mechanized beach landing craft designed to pass through moderate surf was studied in the form of Working Papers Nos. 5 and 27. It was appreciated that work to date had been of a trial nature and, as further conclusions were expected to be reached during the forthcoming inter-session period, it was decided that FAO should be requested to present its report at the next session of the Council. The FAO expert present explained how there is a vast difference between beach landing craft required to pass through surf and the type of vessel required to be beached in sheltered bays or in areas where there is little or only light surf; the latter class of boat being much cheaper to build. It was decided that the Council should obtain from Member Governments an indication as to whether they were interested in either beach landing and/or surf boats and, if so, details of the conditions under which such craft would be required to be used.

21. **Training of Boatbuilders**

The Council decided to urge Member Governments to appoint suitable well-qualified men as Craft Technicians, in the establishments of their Fishery Departments, to carry out this training work at the appropriate levels.

22. **New Gear**

The Council expressed the hope that Member Governments would make available to their fishery workers the necessary funds required to test light fishing and high opening trawls.

23. **Symposium on Improved Types of Fishing**

The Council therefore decided that the Government of India should be approached with a request that, in all cases where the stencils are still available, further copies of the papers of the Symposium on "Improved Types of Fishing from Small Mechanized Boats" might be produced for distribution to Member Governments.

24. **Import of Fishing Gear**

The Council recommended tha consideration should in future be giv Governments to extending credit facilit the purchase of modern gear.

25. **Certification of Fishing Gear**

The Council considered that it duty to point out to Member Gover that the enforcement of many measures rendered it necessary for fishermen to certificated personnel from outside the industry not only tended to delay progr also introduced new social problems an in any case, usually unnecessary.

26. **Food Technology Research**

The Council recommends to M Governments that prompt and adequat sures should be taken to apply resu research in the industry.

27. **Spoilage of Dried Fish**

It was observed that spoilage o fish to a large extent could be a by packaging dry fish in relatively mo proof materials. In this connection, the C suggested that Member Governments like to investigate the possibilities of paraffin-lined paper bags or gunny sack on the inside with bitumen.

28. **Sanitation**

Recognizing that improper sanita the fish curing and drying yards in the are responsible to a considerable exte the poor quality of the products, the C recommended to the Member Governm encourage the fish curing yards to in simple and practical measures of sanita

29. **Fishery Products Manual**

The Council decided to conc during the next inter-session period preparation of the *Fishery Products* It urged the Member Governments to co with the Council and FAO in this resp

30. **Statistics Training Center**

The Council therefore recom that the Member Governments take vantage of the Fishery Statistics T Center. It also urged the Member C

to utilize the services of the participants ill have been trained at this Center, in ractical application of the sampling ques in their respective countries for on of statistics.

hery Statistics

The Council suggested that Member ments might consider the desirability tralized collection of statistics. It was er specially stressed that such centralized cal organizations should have on their officers specially trained in the collection ery statistics and that such officers should le available for collection of statistics in s in preference to those in other fields.

The Council repeated its recommenda- o the Member Governments for imple- g at least a minimum programme of cs.

operative Societies

The Council urged Member Governments st Fishermen's Cooperative Societies in g the requirments of:

1. Close cooperation of members.
2. Efficient management.
3. Economic turnover.

cating the fishermen and providing loans necessary. Governments assisting these es should, however, exercise a minimum rol over them.

The Council was of the view that where zation of Cooperative Societies for under- marketing of fish and fishery products not possible at present, the Government consider the promotion of autonomous as a temporary measure to undertake ctivities until such time as the fishermen zed themselves effectively.

rvey of Credit Facilities

The Council noted that the Factual of Credit Facilities to Fishermen is not te, since information has not yet been ed by some Member Governments. The il decided to complete this report and ted the Member Governments to furnish equired information expeditiously. The il requested Member Governments to information on sources and terms of le governmental and non-governmental facilities.

B. TO F.A.O.

1. Council Procedure

In connection with the coordination of work of the Technical Committees and Panels and to ensure continuity through the inter-session period and the succeeding session, the Council recommended for the attention of FAO that each Technical Secretary should be present at successive sessions of the Council. If this could not be arranged, then it would be advantageous if the Staff member assigned as Technical Secretary for any inter-session period could be present at the following session.

2. Reference Books

The Council examined the draft of a section of the "Handbook of Field Methods in Fisheries Biology" prepared by FAO Fisheries Biology Branch, and suggested that although it is useful for such a book to contain accounts of most well-tried methods, it should also give an indication of which method of several available for the same purpose is recommended for general use, and might be adopted as a standard, at least provisionally. The account of standard methods of water analysis circulated by FAO to the committee during the inter-session period, for comment, is very helpful; it should be generally distributed, and might form a pattern for accounts of methods in other fields. It was suggested that consideration be given by the authors of such accounts to the desirability of beginning each with an introductory section dealing with the means of attacking particular problems, and grouping together the set of methods used in attempting to solve each problem.

The Council was informed of progress made by FAO in preparation of other compilations of methods, and discussed the procedure by which mimeographed drafts could be reviewed by the Council so that amendments might be suggested which would make them conform more closely to the Council's requirements. It has been suggested that the Editor, should, for technical reviewing, enlist the aid of the most qualified and experienced persons in each field, wherever they might be, and then, when their suggestions have been incorporated in the text, the revised draft should be submitted to the Chairman of the Council who would request, for each book, a person or group of persons, working within the Region, to study

the draft with regard to its suitability for use by the Council, and advise him accordingly. These suggestions would then be forwarded to the Editor for incorporation in the published version. Notwithstanding the statement to the contrary contained in the Summary Report of the 7th Session of the Council, the Committee wishes to record its unanimous belief that, such compilations of methods be called "Manuals", and to avoid further confusion the term "Handbooks" be applied to compilations of results, as is the common usage. Combinations of the two might be referred to as "Reference books".

3. **Age Determination**

The Council recommends that Biology Branch, Fisheries Division, Rome, be requested to proceed with all possible speed in the preparation of a general review of age determination with particular reference to tropical problems; and recommends that the report include the following:-

(i) Definition and discussion of the applications of age and growth data to practical fishery problems.

(ii) Discussions of all possible methods of age determination in the tropics.

(iii) With reference to (i) above, descriptions of alternate methods of solving problems that normally require age and growth data for their solution.

(iv) Clear definitions of areas for further scientific investigation looking towards solution of the basic problems. These will serve as guides to the scientific programs of the several member countries.

4. **Standardization of Plankton Studies**

The Council recommended that FAO should make available prototypes of the simple modification of the Hardy Plankton Indicator, in order that countries having opportunities to arrange for the use of such a gear by fishing vessels or other craft may construct copies of it locally.

5. **Indentification of Fish and Plankton**

The Council requests the Fisheries Division of FAO to publish its proposed check-list, (which should include name commercially important aquatic anima least in draft form, before the 9th Ses the Council.

6. **Bibliography**

The Council recommended tha should consider and take action to pr complete Bibliography covering Fi Science, Marine Biology, Statistics, Cr Gear, Technology, Processing, Marketi Socio-Economics, and that the Organ should take appropriate steps to coo their activities in this regard with the States Fish and Wild Life Service in tion with the publication *Commercial F Abstracts* and current measures being in respect of the American Bibliog related to Inland Sports Fisheries.

7. **Fish Culture**

Distribution by FAO of the rev E.D. Le Cren on the application of to inland fisheries is awaited with inte

8. **Rastrelliger**

Certain recommendations from the ing Center are for action by FAO, a hoped that FAO will be able to un this work.

The Council recommended, th that consideration be given by the countries and by FAO to finding me which research workers, (including fo nuity, at least some of the participants Center) can in about three years' time appraise the results obtained from the tion of the proposed techniques of Such a meeting should be conducte workshop at which results would be c and analysed further if necessary.

The Council recommended that th of the Training Center, with the sections of this report appended, be p by FAO as soon as possible and widel buted within the region. It should sent to interested workers elsewhere, larly those concerned with Scombroid

9. **Regional Office Staff**

The Council decided to ask FA could explore ways and means of in the establishment of the Regional O

k by the appointment of one further
s Officer who might be expected to
ze on craft and gear.

orld Fishing Boat Congress

The Council decided that the Secretariat write to Member Governments enquiring r it was their intention to send a ntative to the 2nd World Fishing Boat ss and, if so, whether it would be for the officer concerned to keep a ng brief on the interests of the Council.

ok on Boat Construction

At the previous session of the Council, ad been requested to study the possibi- producing a reference book on the ues of construction of small fishing boats. O officers present at the current session ed how although there is already a rable amount of literature available, this has yet been incorporated in a The acquisition of funds and, also the of time required, for producing such a would present problems. The Council ngly decided instead to request FAO to whatever material it may have, if ry, in mimeograph or pamphlet form.

iled Fish

The Council therefore directed the riat to take adequate measures for the ublication of a comprehensive report on Fish in cooperation with FAO.

liminary Fishery Surveys

The Council requested FAO to ensure r distribution of this handbook on nary Fishery Surveys and the Member nents to promote its use, wherever . It further requested the FAO to h direct contact with the fishery in the region to ascertain their nces in the use of this handbook.

ddleman

Examining the Report on the function middleman contained in Volume 2 of eport on the International Training on Fishermen's Cooperatives and Ad- tion, the Council expressed the view e Report is primarily based on prelimi- servations made during a study currently in progress in India (Bombay), Hong Kong and Malaya. The Council recommended that the study in these countries should be completed and that further extension should be considered after a report on this study has been examined. The Council also emphasized the necessity of close collaboration between Universities and other institutions with the Fishery Departments in pursuing this study.

15. **Survey of Credit Facilities**

The Council requested FAO to make a suitable questionnaire relating to non-governmental sources of credit available to Member Governments at an early date.

16. **Fish Marketing**

The Council requested FAO to organize a short Training Center for experienced fisheries officers directly connected with fish marketing in the member countries.

C. EXECUTIVE COMMITTEE AND SECRETARIAT

1. **Technical Committee Meetings**

The Council recommended that the Secretariat should be instructed to explore ways and means to ensure that the Technical Committees and Special Sub-Committees should meet at least once between plenary sessions.

It was also proposed that the possibility of holding sub-regional meetings should be explored.

It was agreed that the views of Member Governments should be sought and the Secretary should prepare a digest of these opinions which would be circulated to the Governments concerned.

2. **Financial and Budget Report**

The Council decided that a Statement of the Estimated Expenditure of the Council for the period following a proposed Plenary Session should be circulated to Member Governments along with the proposed Agenda for the Plenary Session not less than 60 days in advance of this Session.

This estimated expenditure should be annotated giving as far as possible a detailed analysis of expenditure under the four main items and it should be pointed out that such

expenditure proposals might be subject to modification by the Council in Plenary Session in accordance with further information which might then be available for presentation to the Council by the Secretariat.

The Council recommended that the Budget Estimated for 1960-61 should be presented to the Director-General, FAO.

The Council instructed the Secretariat to seek ways and means of reducing expenditure in connection with interpretation services, where possible, through the employment of locally available interpreters. Provision should nevertheless be made for expenditure adequate to ensure the employment of overseas interpreters if such local interpreters were not available.

The Council considered that if the proposal for inter-session Technical Committee Meetings was acceptable to Member Governments, provision should be made for Council expenditure in connection therewith and that such expenditure might in practice be covered by savings effected by the utilization of local interpretation services.

Symposium

The Council decided that the Symposium subject for the Ninth Session should be "How to formulate programs of fisheries research and technological improvements particularly in fish handling required for the implementation of national policies for fisheries development, and methods of assessing progress on these programs."

The Council instructed the Secretariat to render all possible assistance to the Convenor (Mr. D.J. Gates) in the preparation of the Symposium.

Amendment to the Agreement

The Delegate for the Netherlands tabled a proposed amendment of the Agreement which would permit future amendments of the Agreement to be passed on a basis of a two-thirds majority of Member Governments represented at a Session. The Secretary was instructed to circularize Member Governments on this matter.

3. **Inter-session Technical Committee Meetings**

The Council instructed the Secretary to transmit this proposal, with an indication of financial and administration implicati Member Governments and request tha views should be presented at the 9th Ses

4. **Pre-Session Technical Committee Me**

The Council directed the Secr explore the possibility of arranging for m of the Technical Committees to comm few days in advance of the first plenary of each Council Session in order to work and finalize the report on the Te Committees' activities conducted duri inter-session period.

The Council considered that t cedure would enable the Committees more detailed attention to the items respective agendas during the Council and in this way, increase the efficienc Committees' operations.

5. **Time and Place of Ninth Session**

No invitation having been receiv Member Governments, the matter was to the Executive Committee in acc with the provisions of the Rules of Pr Section II. The Council adopted a mendation that the Ninth Session sh held during the last quarter of 1960.

6. **Participation in International Meeti**

The Council noted that inclu IPFC/C58/WP 22, Schedule of Mee interest to IPFC, were meetings in w Council could profitably participate appointment of observers wherever In this regard the Council directed the riat to circularize the Member Gove with the reports of such observers inc list of documents presented and disc the concerned meetings. Member Gove could then directly contact the orga the meetings to obtain documents i they might be interested.

7. **Principles of Fisheries Policy**

The Council requested the Secr prepare a questionnaire on this sub consideration by Member Governmen a basis of the replies to this quest Occasional Paper 57/3 and Addenda a other information as could be made to prepare a draft for submission to Governments.

ıdardization of Plankton Nets

'he Council noted with pleasure that O had made available a grant sufficient r the cost of 12 Marutoku B type kton nets. The Secretary was instructed in these nets and send one to each country which is not already in pos- of such a net, and which will be able it, either for comparison with other f gear during the next inter-session or lacking such other gear, to begin n survey work. The nets should be ectly to the persons at addresses listed ex I to this report, together with an tion of the recommended mode of use.

Culture in Rice Fields

'he Council deems it desirable to see e Field Fish Culture Sub-Committee ened through the effective participating rk of other member countries at present ng rice field culture, and instructed the y to solicit nominations from the Mem- ernments concerned.

anography

'he Secretary was instructed to enquire mber countries what other data are in e and which have not been published anged between member countries, and t on the possible ways through which nation of this data to intended parties e achieved. Due consideration should be given to the discussions taking place outside this Council with regard to the compilation of oceanographic data on a world basis, and the Secretary is asked to prepare a report on progress in this field for consideration at the 9th Session of the Council.

11. **Sardines**

The 9th Session of the Council should consider the inclusion of sardine studies on the agenda of Technical Committee I, and it is hoped the Report of the sardine meeting would be available as a methodological guide.

12. **UNESCO**

The Council examined WP 13, Projects and Proposals relating to IPFC Region and was unable to express an opinion on the projects as the supporting documents were not available. The Council directed the Secretariat to keep Member Governments apprised of developments.

D. TECHNICAL COMMITTEES

Recommendations relating to the subject matter for consideration by Technical Committees I and II and their respective panels and for the special Sub-Committees are contained in Chapters 2 and 3 of this Report.

E. TECHNICAL ASSISTANCE

Recommendations adopted by the Council in relation to technical assistance are contained in Chapter 5 of this Report.

CHAPTER 7 REPORT ON THE STATUS OF THE INDUSTRY

CONTENTS

A. General ... ...
B. Countries ... ...

Australia ... ...
Papua and New Guinea ... ...
Burma ... ...
Cambodia ... ...
Ceylon ... ...
French Territories *(South Pacific)* ... ...
India ... ...
Indonesia ... ...
Japan ... ...
Korea ... ...
Federation of Malaya ... ...
Netherlands Territories ... ...
Pakistan ... ...
Philippines ... ...
Thailand ... ...
United Kingdom... ... ...

Brunei ... ...
Sarawak ... ...
North Borneo ... ...
Hong Kong ... ...
Singapore ... ...

U.S.A. *(Pacific Territories)* ... ...
Vietnam ... ...

REPORT ON THE STATUS OF THE INDUSTRY

The Secretariat's report on the Status
Industry is one of the basic documents
sideration at each session of the Council
mber Governments have, from time to
en requested to supply information in
ion with modern developments and with
problems related to the fisheries in-
of their countries.

Owing to restricted travel budgets, it is
possible for the Regional Officers to
e visits to all countries within the
during any given inter-session period.
for up-to-date information the office is
ed to rely on data presented by Member
nents.

Much of this data is of course available
rtmental and institutional annual reports.
r since in the majority of cases, these
ayed at least one year in obtaining
l and in publication and distribution,
presented therein is frequently obsolete
time the report is received in the
riat.

Some Member Governments have been
s in supplying the Regional Fisheries
with regular progress reports in connec-
h their fisheries and these are extremely
in preparing this important back-
paper.

Despite the Council's requests, for
tatements indicating the current progress
the industry, during the past inter-
period, the response has been extremely
l official statements have been received
m Korea, Federation of Malaya, Hong
North Borneo and Singapore.

However, on the basis of the reports of
al Committees and replies received from
nents in connection with the activities
the various fields covered by the Tech-
mmittees, valuable information has been
l. This information is consolidated in
rts of the Technical Committee I and
C/C58/WP 18 and IPFC/C58/WP 6) and
where official reports are contained
the material so presented has not been
ed in this document.

GENERAL

Throughout the region, there has been increasing interest in mechanization of fishing craft, the introduction and extension of the use of improved methods of fish catching and in the training of fishermen.

Developments in the biological field, particularly in relation to research have not generally been extensive and it has become clearly evident that in the majority of countries, the bias of the Government policy is towards exploitation and utilization.

This is understandable in so far as in all countries in the region, there have been steady population increases and the demand for protein has increased accordingly. This increased protein demand has not been met, on a regional basis, by the increased production either of fish or of protein derived from agricultural sources.

It appears fairly clear that in all countries the main factor retarding appreciable expansion in fishing activities and hence in fisheries production has been that of finance. Governments are rarely in the position of providing even interest-bearing loans of the magnitude which could be absorbed by the fisheries industry, apart from the very real problem of organizing the necessary administrative services to operate such a loan system.

Within the industry itself, the demand for fishing boat engines, mechanized equipment for gear handling, the provision of supplies of synthetic fibers for nets and the establishment of shore facilities for fish handling and storage is increasing annually.

In certain countries, emphasis is being placed on the production of luxury items such as crayfish, shrimp and oysters for export to foreign countries with the consequent improvement in the foreign exchange position.

In the secondary phase of the fisheries industries, the outstanding need is for systems of quality improvement and within this generalized subject fall such problems as improvements of marketing and transport facilities, greater ice supplies and increased cold-storage capacity. In fish processing. some

improvements are already being effected, mainly at the commercial level, in canneries and establishments producing fermented fish sauce and fish paste.

Extra—territorial markets for marine products, particularly the luxury items mentioned above, appear to be expanding and this fact is well recognized by governments within the region when formulating fisheries development policies and program.

AUSTRALIA

Australian marine and fresh water fisheries production in 1956-57 totalled 116,309,669 lb. (52,868 metric tons, compared with 47,644 tons the previous year).

The 1956-57 total comprised (lb.):

Marine Fish	71,812,901
Crustuceans	24,816,216
Mollusks	17,830,172
Fresh Water Fish	1,850,380

Compared with 1955-56, the marine fish catch was up approximately 14 crustaceans slightly down, mollusks slightly up and fresh water fish slightly down.

The greater marine fish catch was due to increases of approximately 38 in South Australia, 36 in Victoria, 28 in New South Wales, and 13 in Tasmania.

These States all had a very good year. In New South Wales the bigger catch was due mainly to an increase of 4,000,000 lb. in the motor trawler catch.

New South Wales, the predominant fishing State, produced approximately 36 of the Australian fisheries catch and Western Australia 17 But about 24 of New South Wales production was oysters, which are farmed, and half the Western Australian catch was crayfish for export. About one third of the South Australian catch and one-fifth of the Tasmanian were crayfish.

Of the 24.8 million lb. crustacean catch, three-quarters was crayfish and one-fifth prawns.

Of 17.8 million lb. mollusk production, 60 was oysters (almost all New South Wales) and 40 was scallops (83 Tasmanian and 17 Queensland). The Queensland scallop catch of 1.2 million lb. was more than double the previous year.

Again in 1956-57 only three fishes 10 or more of the total marine fish catch

	lb
Aust. Salmon	12,14
Mullet	11,24
Shark	7,76

The interesting feature of the li displacement of mullet from its usu place by Australian Salmon. It was a salmon year and the 12.1 million lb compares with 7.6 million lb. in 1 The mullet and shark catches were st

	% Marine Fish Catch	%
Aust. Salmon	17	
Mullet	16	
Shark	11	

Of the three chief trawled fishes, r was up from to 2,712,715 lb. to 3,895 and flathead from 4,958,097 lb. to 5,01 The nannygai catch which, when the only four Sydney-based steam trawl operating in 1955-56, fell (by 50 c with 1954-55) to 495,153 lb. drop 437,424 lb.

The erratic barracouta catch w third greater than the previous year. how the couta catch has varied in the years:

1951/52	9,89
52/53	9,46
53/54	5,26
54/55	5,62
55/56	3,45
56/57	4,60

The tuna catch of 2,261,117 lb record. It was almost all taken in Ne Wales (1,682,769 lb.) and South A (490,000 lb). A breakdown of the taken in New South Wales is not a The South Australian catch was all Bluefin.

The shore-based whaling industry its tenth year of operation in June 19 assets estimated to be A£2,250,000 an output of products in excess of A£2 mil

earl and *Trochus* shell production
d from 5,047,520 lbs. in 1955-56 to
3 lbs., in 1956-57.

ate fisheries departments are conducting
with the biology and occurrence of
pecies of fish of considerable commer-
portance, including grey mullet, red
school mackerel and tuna.

he CSIRO Division of Fisheries and
raphy is concentrating the great part of
rch facilities on extended oceanographi-
ies and research with fish physiology
aviour.

vestigations in connection with whaling
pearl shell fishery are being undertaken
Division of Fisheries, Department of
Industry.

PAPUA AND NEW GUINEA

promising start in inland fish culture
n made, initially at the subsistance and
levels, but with the possibility of
n into commercial fields.

he Administration is conducting a
of fishing experiments designed to
rate the commercial fisheries potential
vaters of the Coral Sea and to attract
nterprise into the industry.

he demonstration is being conducted
n.v. TAGULA a 60 ft. research vessel,
ith modern navigational and fishing
nd equipped with a 5-ton capacity
tor, with an additional 5 tons of non-
ted holding space.

BURMA

ocal administration of the fisheries
es remains in the hands of provincial
rative officers. Technological develop-
d extension service in all phases of the
is largely the responsibility of the
s Division of the Land and Rural
ment Corporation.

he Government has recognized the
nce of establishing a Fisheries Depart-
t it is unlikely that finance will be
for such an undertaking for some time

The development of fisheries cooperatives-producer and marketing has been in progress for some years under the aegis of the Department of Cooperatives and Commodity Supplies.

No adequate organization exists for collecting fisheries production statistics nor is there a comprehensive coverage of men, boats and gear engaged.

Programs for the development and extension of fish culture have been in operation for some years but no assessment of the current situation is available.

A Colombo Plan expert is engaged in a small program of craft mechanization and the training of operatives in engine operation and maintenance.

The production of trawl-caught fish from the Gulf Martaban appears to be increasing as the early consumer resistance to marine fish is being overcome.

CAMBODIA

Action now being taken to develop new and improved harbor facilities at Kompong Som is expected to assist in the development of the marine fisheries. From a pre-war estimate of about 10,000 metric tons annually, production is believed to have declined to not more than 5,000 metric tons at present.

Inland fisheries also are believed to have declined to a small portion of the pre-war level, particularly in the region of the Grand Lac. Surveys being undertaken at present, both the larger Mekong River Basin Development Project and a smaller survey directly concerned with the fisheries of the Grand Lac (Tonle Sap) are expected to yield information as to the causes of this decline in production and to suggest means for re-establishing these fisheries.

A statement of the development program of the Service National des Peches was issued in IPFC Occasional Paper 57/3.

CEYLON

The Government's program for fisheries development is proceeding steadily. Considerable advances in the development of improved road facilities from the coast inland, the removal of rocks and reefs which interfere with fishing operations, the establishment of a Fishermen's Accident Compensation Scheme and coordina-

tion with other departments for the continuation of an Air-Sea Rescue Service have been satisfactorily developed.

Steady progress has been made in mechanization of fishing craft. Vallams which were modified to take in engines are now being designed for the installation of engines. This type of craft is yet restricted to the Northern part of the Island. It is intended to fish the Pedro Banks with these vallams. Several outrigger canoes have been successfully mechanized with outboard engines. The new interest-free loan scheme recently authorized permits the granting of loans without any form of security for the purchase of mechanized boats, fishing gear and payment of insurance premiums. Loans up to Rs. 15,000/- are granted to selected full-time fishermen and are repayable, in the case of boats, in 5 years and in the case of fishing gear in 2 years. A parallel scheme for the issue of loans for engines only is also in operation.

The training program for Government Fisheries Officers of the Extension service has continued to develop. At the completion of their training period they are attached to the several fishing craft operated by the Department. These fishing craft are sent to various fishing villages for practical demonstrations of new methods of fishing. Fishermen from these villages are taken out in the boats and taught to operate the gear. They are given full travelling expenses and also given a part of the catch as compensation for loss of fishing time. Fishermen who obtain loans for the purchase of mechanized craft and those who purchased mechanized craft are also given special training by officers of the Department before they commence actual fishing operations.

In addition to the above, social security services including housing facilities and other assistance is being extended through the fishermen's communities.

The Statistical Service and the Research Organization are maintaining their programs of activities.

Considerable development in the exploitation of fisheries of inland waters is taking place and there has been extensive development in fish culture operations including the stocking of impounded waters with several species of edible fish.

The introduction of fishing gea from synthetic fibers has developed at rapid pace that importers ran out of Shipping difficulties have created an shortage of this type of gear and dur past few months the supply has no sufficient to cope up with the demand.

The Cold Storage Plant at Mutwa in full operation. It has a freezing cap 12 tons per day and a holding capacity tons of frozen fish; 10½ tons of block also produced daily.

SOUTH PACIFIC FRENCH TERRITO

Fishing in New Caledonia is at confined to activities directed towards th of fresh fish consumption by a populatio exceeding 60,000. These activities are in fact to supplying fish to the popul Noumea and its surrounding areas 25,000), the rest of the island being from some other sources. Consequently small scale operation cannot yield precis tics, taking also into account the s condition and the low importance of the of production and sales organizations small quantities of fish not consumed f salted and smoked. Almost everywhere is done by angling among the coral reef fact implies that improvement in the s can be expected only in the develop commercial fishing, together with a export outlet.

Such development has already place in the Franco-English Condomi New Hebrides (Santo Island) in the f fishing, canning and export enterprise Franco-Japanese and Anglo-Japanese Co with a fleet of 8 Japanese longliners store in the process of enlargement, a factory under construction, a wharf, a smokehouse and various installations precise annual production is not kno the first year's work of the enterprise yet ended and since the fleet of fishi has increased from 3 in the beginning present and is likely to reach a size tons. No statistics on this activity ar available.

In French Oceania, mainly Ta fishing industry is practically of the sa as in New Caledonia, with the differen

rates more on coastal tuna and skipjack
These fish have just made their
nce in the Noumea Market. It is noted
e population's consumption is much
and that the Papeete market retails 500
tons of fish yearly for a population
ibly smaller than that of Noumea. This
consumed fresh and not chilled or
the deliveries being made daily.

INDIA

esearch in all aspects of fisheries has
ed at a high level. Of particular interest
pplication of the pituitary-gland extract
n system which has been found success-
induce spawning in several of the
of "major carps". Refinements of
ues are being developed.

Fish seed" handlings, including fry and
w exceed 11 million annually for distri-
to under-supplied areas. This "fish
s however taken from natural spawning
.

otal fish production exceeded one million
tons in 1956 and there are indications
duction is being maintained at a high
Exploratory fishing is continuing in
eas and new and productive grounds are
liscovered, while known grounds are
ibjected to a higher degree of exploita-
new fishing methods are introduced and
ed and the craft mechanization pro-
dvances.

he Government, on its own initiative
with assistance of FAO and TCM is
ng its fisheries training program,
facilities for elementary and advanced
in many aspects of fisheries biology and
gy.

With a well-established program covering
ogical aspects of fisheries, India is now
ng its program in connection with
s in fisheries technology and steps are
aken to achieve closer coordination
Central and State Governments fisheries
is.

tatistical services and research are
a high level and particular attention
given to the development and applica-
adequate sampling techniques in zones
industry where complete statistical
e is not as yet practicable.

INDONESIA

Introduction

During the present inter-session period, the Republic of Indonesia has been striving for improvements both in the technical field as well as in the provision of material for the purpose of increasing the fish production and thus help to overcome the problem of food shortage. Indonesia's general condition at present, which is unfavorable, hampers the efforts of solving this food problem. In spite of all these difficulties, however, noticeable progress has been made in the attempts at improving the fisheries.

The Government and the people realize that the country's natural structure is such that both sea and inland fisheries are important resources for the population's welfare.

Fish production

Compared with the 1956 sea fishery production of 419,000 tons, the 1957 production of 400,000 tons shows a decrease of 5%. This decreased production is partly caused by the late season and partly by the many rains during the fishing season.

The production of inland fisheries, which amounted to 296,026 tons in 1956 was increased to 321,230 tons in 1957, which means an increase of 8%. This increase is a result of the improvement of the fish ponds and of the enlargement of the fish breeding area. Thus, the total fish production in 1957 has increased by 16,204 tons or approximately 2.15%, compared with that of previous year. Although an increase has been recorded, fishery officials are still dissatisfied with the results and they hope to make a higher increase percentage in the years to come.

Technical Training

As the shortage of officials with technical knowledge is strongly felt in Indonesia, technical training forms one of the main issues. For this reason much attention and efforts have been given to this item.

During the reported period a few new schools were established, such as:

1. The school for inland fishery "mantris" (field workers) at:
   (a) Singaradja for the Nusa Tenggara Province.
   (b) Bandjarmasin for the South Kalimantan Province.

(c) Makassar for the South East Sulawesi Province.

(d) Kotaagung for the South Sumatra Province.

These schools provide a one year training to students after their primary school education. Nearly all of the students become officials after their training.

2. Senior High School for Inland Fisheries. It is a 4-year course and is for junior high school graduates. For the first couple of years to come, this school will only educate people for the middle rank positions at the Inland Fisheries.

The Sea Fisheries attach more weight to courses and training of cadres in the following fields:

(a) Biology
(b) Extension work
(c) Technology
(d) Mechanized fishing
(e) Courses for engine drivers and shippers
(f) Additional course for office administration.

New Junior Fisheries High Schools have been established in Menado (North Sulawesi) and Ambon (Moluccas) beside the already existing fisheries school in Tegal (Java).

Besides establishing the above-mentioned schools and courses both the Inland Fisheries and the Sea Fisheries have sent fisheries workers abroad (Canada, Japan, Australia, U.S.A.) under the foreign aid program as well as on the State's initiative, for practical training as well as for academic study. And in conclusion, the sea fisheries has welcomed the arrivals of Messrs. L.E. Wakefield of the USOM and Tatsuzo Tonomura, Japanese Cannery Technician, who have been appointed to assist the Indonesian Government in the field of Fisheries Technology.

Mechanization

The Sea Fisheries has been continuing the construction and the distribution of mechanized fishing boats to the fishermen. Progress in the fish production as a result of mechanization has been achieved after a period of experiments. People's requests for mechanized fishing boats have exceeded the Government's capacity to supply them.

The Inland Fisheries have apl liliput dredgers for the repair of supply Two of the dredges are placed in the Ea bandeng-culture center (Gresik and Sid and the other one at Indramaju (West Ja

Research

The Inland Fisheries is already possession of a new inland fisheries lab in Bogor, whereas the sea fisheries ser intending to build a technological labora Djakarta. Besides, inland fisheries circl erected experimental stations at Se (Sulawesi Selatan and Tenggara Provinc experimental fish ponds at Depok, near D New bandeng ponds have also been mad Belawan area (East Sumatra), at Kota (South Sumatra) and at Pagetan (Sout mantan).

The bandeng fry for Sumatra w directly from Java, whereas that for Kalimantan was obtained from the St Macassar.

By the Sea Fisheries, various res have been made, such as longline, trawl, tuna, purse seine, otoshi-ami an ami fishing.

Research work in the field of fi servation has been done as usual. M Butler, of the FAO Dr. Ichsan El Ra Dr. Oey Kam Nio have rendered valu sistance in this research work. The on agar-agar from all over Indonesia h started with the help of the Research of Cronulla (Australia).

An extensive Model Fishing Co Development project was nearing co at Kota Baru, South-east Kalimantan end of 1957 and will provide modern f in all phases, production, handling a cessing of the industry. Training f are included and essential community such as water supply and electricity a provided.

Experimental and exploratory fis tuna and shrimp is being continued extension services aimed at increas supply of fish by inland and brackis fishculture are being maintained at a hi

An extended program of trai fisheries technology and biology as instruction in navigation and engine re

ance is being implemented. Advantage n taken of facilities provided by FAO, O, Colombo Plan and ICA to obtain d training in fisheries subjects for l Government officers.

By the end of 1957, 251 fisheries cooperatives with over 35,000 members had been registered with assets exceeding two million rupiahs.

INDONESIAN STATEMENT ON THE NON-PARTICIPATION IN THE INDO-PACIFIC FISHERIES YEAR

The Government of Indonesia had the to emphasize the importance of the hment of the Indo-Pacific Fisheries Year together with other member countries the VIIth IPFC Session in Bandung in ation of the 1955 Session held in Tokyo.

A minimum program for the realization IPFY was born in Bandung. After the g Session was over, Indonesia as a country undertook initial steps, l to the arrangements of the program, ussing this important problem with the ties concerned, which resulted in certain ns to be carried out.

A minimum program in the framework of FY has been composed during the VIIth session in Bandung, which covered the ng items (a) total fish production of a , computed regionally by suitable sampl- hniques or by total enumeration when e, together with break-up of fish landings ing the major commercial species and f fishing techniques employed, (b) total population (with separate figures for adult fishermen), and (c) fishing craft ar employed in fishing with their dis- n. This program was to be commenced possible by the 1st of July 1957, but in e was not to be delayed beyond January However, for Indonesia, to obtain the ry statistical data a more intensive tion effort is required.

is to be regretted, that in her further ts Indonesia had to face enormous pro- so difficult to be overcome, that she was led not to take part in this important y not carrying out the IPFY in practice.

These obstacles are among others:

(a) the amount of available skilled or trained personnel, to carry out this important work, which covers the entire waters of Indonesia with its coastal length of not less than three times the equator, is far from sufficient to meet this requirement;

(b) the communication between the islands is quite difficult, so that in order to carry out these efforts, a period of more than one year is needed. There are also certain areas which are yet to be serviced by the various services concerned with this gigantic work;

(c) the domestic situation in 1958 did not allow the execution of these activities.

As a result of the above-mentioned difficulties which could not be surmounted within this year, the Indonesian Government has been actuated to make the following statement:

(1) Indonesia deeply appreciates the efforts of the Indo-Pacific Fisheries Council in the field of the IPFY.

(2) All attempts have been made, but Indonesia has been only able to take the initial steps in 1958, so that this year for Indonesia does not form a year of practice in the layout of the IPFY.

(3) For domestic use, these preparatory efforts will be maintained and will be further carried out.

(4) Indonesia is anxious to take part in the following IPFY, since 1958 has been declared as the first IPFY by the Indo-Pacific Fisheries Council.

(5) Indonesia directs her thoughts to the coming 1962 Agricultural Census, which will be organized by FAO and which accordingly might become an expedient solution for the IPFY problems.

The facts have shown, that however minimum the IPFY program may be, as has been arranged at the Bandung Session, Indonesia needs comprehensive preparations, for by carrying out the program even a little inaccurately just in one district of Indonesia only, it will be sufficient enough to upset the whole scheme and to decrease the important purpose of the IPFY.

It is accordingly to be fully regretted, that Indonesia is not in a position to take part in the IPFY business in 1958 and that she is only limited to the preliminary and initial steps of the whole program. The achievements of other member countries which have already made certain contributions towards the implementation of this important and valuable work, will be of great value in determining our steps in the future.

JAPAN

Maintaining her immense production of over four and three quarters million metric tons, Japan is seeking every avenue to develop and improve her fisheries. Technological research into improvements in craft, gear and methods is being maintained at a high level under a new Fisheries Development Plan designed to carry through until 1975 and incorporating measures for the stabilization of living conditions of farmers, forestry workers and fishermen through increased production and increased earnings.

The five year program of exploratory fishing in the warm Tsu-shima Current will be completed this year and the final report is awaited with interest. The results obtained have been published for use by the fishing industry from time to time and have been of considerable value in increasing production for the area traversed by the current.

Of extreme importance to fish cu in South East Asia has been the devel of a technique for the artificial propaga Chinese, Silver and Grass Carp. Refin of techniques are required, but the worl menced 14 years ago, will result in im supplies of eggs and fry of these im pond fish.

The total fish production in Japan for whale catches) that maintained an level of 4.50 - 4.9 million tons for severa in the past, reached in 1957 5.4 million about 13 per cent above the previou which breaks all the previous records in and postwar days.

An increased production was almost all fish species; especially, the of anchovy, mackerel-pike, squid and mackerel recorded a striking increase than 20 per cent above the previous yea catches, by coastal fisheries ran up int 2.6 million tons, those by off-shore fi into some 1.9 million tons and those b seas fisheries into some 0.9 million ton show an increase by 13 per cent, 16 p and 10 per cent above 1956 respectivel major types of fisheries which played portant role in such increased product squid angling, small type trawl fishing culture industry in coastal waters; ma pike stick-held dip net fishery, two-bo rounding fisheries, salmon drift-net fish mackerel pole and line fishing in o waters; and skipjack pole and line fishin longline fishing, factoryship type tu salmon fisheries in high seas. Among types, the catches by mackerel pike sti dip net fishery amounted to 0.7 million 29 per cent above the previous year, because of the good migration of stock high efficiency of production by large craft of 30 - 50 tons.

The outlook of this year, 1958 seems very bright, because an increas duction has already been registered fr beginning of the year in regard to sk anchovy, horse mackerel, mackerel and ma pike; and it is expected that the to production will exceed the record in some 10 per cent.

The fishing fleet as of the end consisted of 403,000 vessels (1,572,60 tons), of which 26,300 non-powered

tons) and 2,400 powered boats (3,400 were operated in inland waters; 219,800 vered boats (216,800 tons) and 154,600 d boats (1,340,000 tons) fished in the n comparing the fleet in 1957 with that , a 4 per cent decrease is seen in the of boats and 20 per cent increase in the nnage; namely, in inland waters 5 per crease in the number and tonnage of vered boats, but 8 per cent and 6 per crease in the number and tonnage of d boats respectively, while in the sea 6 t and 9 per cent decrease in the number nage of non-powered boats respectively, r cent increase and 4 per cent increase number and tonnage of powered boats ively. This increase in the number of d boats of over 200 tons as well as in the of powered boats of 0-5 tons and 50-99 erated in the sea on the one hand and crease in the number of all other boats other hand show an increasing trend of torization of non-powered vessels and rgement of fishing boats.

With regard to the equipment of fishing more Diesels are being used by small and more superchargers are being in- in large and medium sized boats. Fish- ts equipped with wireless now number , and almost all fishing boats, except for being operated in coastal waters, are d with wireless stations. Other fishing d aids such as synthetic fiber nets and adio buoys, fish finders, direction finders, lorans, etc. of increasing importance for and navigation are widely used by boats as far as the fisheries management .

With regard to the consumption of fish- roducts in 1957, of the total amount of ption, 6 per cent was allocated to uses, and 94 per cent to food. There is easing trend of allocating them to food Of the total amount of food consumption, cent was used as raw material of pro- products, 23 per cent as fresh fish and ent as frozen products. There is an ing trend towards using fish as raw l for fish sausage, canned fish, etc.

The production of canned products in ached some 14 million standard cases, t 30 per cent above the previous year. rkable increase was seen especially in the canned products of whale, squid, mackerel-pike, mackerel, and sardine, all of which are popular fish and are harvested in great quantity. The production of fish sausage in 1957 amounted to some 37 thousand tons, or 47 per cent above the previous year, or 9 times increase compared with that in 1954. This shows that a gradual change has recently occurred in the structure of people's consumption and the demand for fisheries products according to the modernization of their mode of living, and that the increased demand for comparatively highly processed products such as fish cake and canned products has established a firm and steady condition in the consumption of fish.

The exports of fisheries products in 1957 constituted only 8.4 per cent of the total yearly amount of fisheries production. Compared with the previous year, the exports of frozen tuna showed an increase by 28 per cent, those of canned products no change, and those of salted or dried products a decrease by 6 per cent; on the whole, almost the same as in the previous year. But this year is expected to have a brighter outlook because the exports of frozen tuna and canned salmon have already shown a very favorable tone from the beginning.

As mentioned above, the fish production of Japan in recent years maintains a high level and has a bright prospect of promotion in the future. The causes of such favorable conditions may include not only the recent good condition of popular fish migrations, but also the improvement of fishing boats, the modernization of the means of production, the positive efforts of fishermen together with the promotive measures of the Government. But the producer price of catches which began to decline last year still continues its downward tendency though the price of fishing materials does not show such sharp downward movement. Besides, tightness in the money market is forcing fishermen to rely strongly on funds through cooperatives or on loans from the agriculture, forestry and fisheries finance funds. Consequently there has occurred a strong cry for rationalization or readjustment of the management, especially of smaller fishermen. There is an increasing tendency in the number of small fishermen who are obliged to work on farms or in other business as a side job. In order to cope with such situations, the Government has undertaken, especially for the

great number of small fishermen operating in coastal waters to improve and rationalize fisheries techniques and production means, technical and financial assistance, the consolidation of fishermen's cooperatives and the improvement of the marketing organization of fisheries products. These measures will be strongly promoted in the near future.

KOREA*

1. Characteristics of Korean Fishing Waters

The fishing waters in the immediate vicinity of Korea are among the best in the world. On the west coast of Korea, which faces China, are the shallow protected waters of the Yellow sea: on the east coast warm and cold currents flowing both north and south bring with them quantities of whale, Alaska pollack, cuttlefish, mackerel-pike and yellow tail. In the Straits of Japan, between the southern tip of Korea and the southern-most Japanese island of Kyushu, migratory fish are easily trapped. In the areas southwest of Chinhae, latitude 35 10′ longitude 128 4′ and the waters surrounding Ullung-do, latitude 37 31′ longitude 130 50′, and the area immediately to the south of Cheju-do, latitude 33 20′ longitude 126 30′ are found great quantities of mackerel, cod, anchovy and hairtail.

Principal areas

The East Sea

The ocean floor shelves off rapidly. Depths of 2,000 meters are found within a few miles of the coast. The bottoms of these coastal waters are rocky and do not lend themselves to dragnetting operations. The deeper outer waters are utilized principally for schoolfishing. Until the recent disappearance of the sardine from these waters, they were the principal source of the Korean sardine catch.

The Southern Coastal Waters

Waters of the Japanese Straits average 125 meters in depth, and shoal to an average of 80 meters in the southern coastal area. Here, too, the ocean floor is rocky and does not submit to dragnet operations, but the a suitable for fishing for the oceanic types, ab and sea urchins.

Yellow Sea

The ocean floor of the Yellow S either sandy or muddy and is, therefore, for dragnet fishing. It is a particularly area for flounder and other fish found cl the ocean floor. The average depth of thi is about 75 meters.

Water temperatures

Temperature of the surface wate rounding Korea ranges from 0-14′C. in Feb to 18-24 in July, according to records Fisheries Experiment Station in Pusan. perature ranges as recorded varied from to south in the Japan Sea and from the c waters seaward into the Yellow Sea.

Salinity

The salinity of the water surrou Korea varies from 31 to 34 parts per tho the lower salinity being found closest in The salinity varies with the season also, least in the fall months.

Principal kinds of fish

Among the important species o caught in Korean waters are Alaska po hairtail, anchovy, saury pike, yellow cr mackerel, horse mackerel, sharks, flatfish lance, "Kang dari", whip ray, Tongus cod, red sea bream, mullet, bastard h other croakers, yellow tail, skate ray, Sp mackerel, flathead, sea eel, puffer, sharp t eel, common sea-bass, pomfret, rock "Jun-tchi", black sea gouneles, rock trou Gurnard, blue fin tuna, "Ban-chi, eel, bi herring, atka fish, hickory-shad, cottoids fish, and various fishes belonging to the and Blennie family.

2. Fishing Population

Looking at the fishing population in after the liberation, the number of fish increased considerably from 400,000 imme after the liberation to 780,000 as of 1957. majority of the fishermen, however, ar and small scale operators who are enga

*Note: The tables submitted with this report are omitted from the present document. The retained on the files of the Secretariat Secretary.

by small sail boats, laver and oyster

3. Marine Production

The peak year for Korea in the fish was 1937, when landings amounted to 00 metric tons. After 1937, except 1939, nual catch has been decreasing each In 1942, the landings aggregated only metric tons (including both South and Korea's landings). South Korea's catch excluding 50,902 tons of sardines, which now disappeared, was 397,066 metric After the liberation up until 1955, the s fluctuated. From 1956 however, marine tion began to increase, the total catch in ing as much as 403,157 metric tons.

4. Production Facilities

Vessels

A majority of the Korean fishing vessels ling vessels of small tonnage. Out of fishing boats reported for 1957, the y are sailing vessels: only 4,598 were d vessels. Vessels of small size are ly limited to inshore operations; there sequently, a large demonstrable need for vessels to exploit the rich off-shore grounds to the south and west of Korea, only a minor degree at the present The tonnage of the fishing boats for n 1957 is 105,346 tons.

Ports or Harbors

There are about 60 fishing ports, large ll, along the coast of south Korea which fair to good facilities for the fishing Many of these ports have good mooring cking facilities and have been improved eakwaters, sea walls, wharves, and most facilities needed for loading and ng. Very little maintenance and repair ad been done for a number of years, any of the ports were badly run down lly during the Korean war, but with vernment subsidies and the economic ce funds by FOA and ICA, most of jor fishing ports have been rehabilitated.

rds

Shipyards are located in most of the fishing ports. A total of 142 shipyards as of December 31, 1958. The yards om the simplest beaching facilities, or ways for hauling out the smaller boats for repairs, to very good installations with numbers of ways capable of handling larger vessels of up to 9,600 tons class. Some larger yards, with steel fabricating equipment, well-equipped carpenter shops, machine shops, blacksmith shops and foundries, are capable of fabricating both steel and wooden vessels. Lack of capital and materials in particular has retarded fishing boat construction. Fishing boats have been continuously constructed with fishermen's own funds and/or economic assistance funds. ICA has been spending a large amount of its funds to import material and equipment required for fishing boat construction alogn with cargo vessel construction, and training technicians.

Boat Supplies

Immediately after the liberation and especially after the Korean war, the fishing fleet suffered seriously from a shortage of repair and operating supplies. A shortage of boat lumber, engine parts, sail canvas, nets and Manila rope were the most serious handicaps to the fleet operations. Boat paints, nails, wire rope, and other supplies have been needed in large quantities. Domestic production of boat supplies has been very low, largely because of the lack of raw material. Fuel and lubricating oils have been occasionally in short supply. But, supply has been fairly good most of the time lately because these materials and equipment have been procured from abroad along with other supplies and manufacturing facilities by the foreign economic assistance agencies such as UNKRA, FOA and ICA.

Type of Gear

The most important types of gear are bottom drag or trawl nets, in all of their various forms, purse seines, drift and set gillnets, beach seines, traps and weirs, longlines and hand lines. Diving, both with and without the use of a mechanical diving suit, is very common.

Net and Rope Production

Production facilities for fishing nets, twine and rope are generally in good condition. There are major fish net and twine-making factories, and in addition, some netting is fabricated at home by hand or by the use of hand-operated machines. A total of 31 fish net factories exist in Korea at present and their production can sufficiently meet the

demand of fish net except nylon and for Kuralon nets. They produced 1,075 metric tons of various types of fish nets in 1957. Nylon and Kuralon fish nets and or their materials are imported from abroad because there are only a few nylon fish net factories in Korea.

Rope production facilities are good, but the shortage of Manila fiber and other good fibers has limited domestic rope production to a poor grade made of domestic hemp fibers, of very little value in fishery activities. There are 13 rope factories in Korea with an estimated yearly production capacity of 4,000 metric tons, sufficient for the present estimated fisheries and industrial needs. The rope plants produced a total of 1,474 metric tons of various sizes of rope in 1957. Large quantities of abaca are imported from abroad every year.

5. Marine and fresh water products culture

Oyster culture

Oyster culture is one of the important industries along with laver culture in Korea. Since laver culture farmers cannot make their living from laver culture, due to the limited market for their products, a five year plan for oyster culture is being undertaken to assist in solving this problem and render a great contribution to the industrial economy of the nation.

Oyster culture, in comparison with laver culture, not only involves high installation costs and much labor, but also brings more profit to the fishermen, because oyster collecting devices once prepared can be used for a relatively long period of time. This industry will also play an important role in extending markets and in earning foreign exchange, because oyster products are suited for the taste of the people of the European, American and South East Asian countries.

If 6,500,000 pyung (about 390,000,000 square feet) of seashore suited for oyster culture is cultivated, a large scale industry can develop which could produce about 60,000 tons of oysters and earn about 6,000,000,000 Hwan at the current price.

Cultivation of Shallow Water and Tidal Areas

There are about 1,640,000 acres of tidal and shallow water areas along the south and west coasts of Korea. A five year program has undertaken to propagate 4 species of sh and 2 species of seaweeds which are comme ly valuable. The shellfish and seaweed be propagated over 3,268 acres of the each year, a total of 16,340 acres durin years. Upon the completion of this pr in 1963, a total of 93,600 metric tons of products, 91,800 metric tons of shellfis 1,800 metric tons of seaweeds, valu 5,600,000,000 Hwan* will be harvested. plan aims at bringing benefit to the fishermen.

Culture of fresh water fish

There exist two national fish hatc in Korea, which chiefly distribute carp lings to fish culturists whose number aggr 48 at present and for release in rivers, and reservoirs. There are 15 main riv a total extended length of 6,652 kilomete vast inland water areas of 55,489,880 kilometers (natural lakes of 282,238 kilometers, reservoirs of 1,283,161 kilometers, and ponds of 430,695 kilometers) which are mutually suited fo water fish to inhabit. Approximatel species of fish inhabit the water area, little more than ten species among the suitable for culture for they are comme valuable. Carp is the major species wh being cultured at present. If those uncult rivers, streams, lakes and ponds are utiliz culture of adaptable species of fish, mor 63,000 metric tons of fresh water fish easily produced annually. But, the catch of fresh water fish reaches not than 2,000 metric tons a year, and only 26 tons out of the catch are cultured It is due to shortage of young fish incomplete facilities of fish culture. A demand of young fish at the present t approximately 100,000,000; but, 4,500,00 which are equivalent to only 5% of the dem quantity are available generally fro hatcheries.

The first step toward the goal release 100,000,000 young fish on the ir rice paddies which are considered to be ea efficient for fish culture. A year aft release of the fish, 10,500 metric tons of fish of a year old will be harvested; harvested fish of a year old, 5,250 metri

* 500 Hwan = US$ 1.00 at official rates of exc

old as fresh fish for food, and the other be released again in lakes, ponds and rs. Those fish will be harvested when come three years old. The national es will release about 1,500,000 young a year old into the main rivers and and will have an annual production of ic tons. It is then planned to hatch fish ly and release them into the inland rea, where favorable water temperature produce 250 metric tons of fish annually. 50 hatcheries to be privately operated annually installed by granting of nent subsidies in order to produce 2,500 ons of fish annually. Thus, upon con- of the five year plan, approximately metric tons of fresh water fish will be harvested.

3. Manufacturing and Processing

nning

ish canning was started in Korea about ago. The operation of canneries on a cale business basis began after 1930. ion of canned fish and shellfish reached k of 6,106 metric tons in 1940 when eeded canned fish so badly because of its consumption during the world war II. re was equivalent to 10% of the total production.

fter Korea was liberated from Japan, on of canned fish sharply decreased o the nonavailability of tin plate and markets and shortage of funds. During an hostilities, the production of canned denly increased in order to meet the by the military. As a result of the joint y the Government and civilian enterprise oving techniques and in modernizing on facilities, there exist 38 canneries resent time, which have a total pro- on capacity of 400 million cases of fish annually whereas 300 million cases oduced by 44 canneries which were in e prior to 1945. However, the exports ned fish has not been realized as had pected.

n the other hand, two modern fish s have been built and are in operation, Po-hang Port and the other on Naro-do with the aid funds of $324,500 under United Nations Korean Reconstruction Agency Project. The two canneries will chiefly produce the canned fish for both domestic markets and for export purposes.

Species canned at present include mackerel, horse-mackerel, ligament, ear shell, top shell, sea eel, white clam, red clam, oyster, yellowtail, shrimp, crab, etc.

Can Making Industry

Can making industry in past years which supplies empty tin cans chiefly to fish canners was not as active as it is at present due to insufficient production facilities and shortage of tin plate. Since the Korean War large quantities of canned fish have been consumed by the military, The military furnished the can maker with tin plate; but the empty cans which are used for packing canned products for the domestic market and export purpose are in short supply. In order to increase foreign export of canned fish, the Government is planning to import various can making machines from abroad which will be able to make types of cans that can meet foreign demand.

Agar-agar production

Although agar-agar has accounted for a large portion of the foreign trade since 1945, its industry is now facing severe difficulty for mechanical agar-agar products have recently appeared in the foreign markets. Three modernized mechanical agar-agar plants are under construction with the U.S. International Cooperation Administration fund of $755,000, two of which will be completed within a few months. The three plants will be able to operate and export their products within this year. Besides these plants, there exists another mechanical agar-agar plant which was constructed in 1956 and is being operated by a private enterprise. The four plants will produce approximately 400 metric tons of agar-agar annually. On the other hand, 300 metric tons of natural agar-agar will also be continuously exported. We are making efforts to improve the quality of agar-agar and cut down the production cost of the natural agar-agar in order to maintain foreign markets for the products. Thus, by exporting a total of 800 metric tons of agar-agar each year, we plan to earn 2 million dollars worth of foreign exchange annually.

Ice Making, Cold Storage and Freezing Facilities

There are 65 ice plants at fishing ports along the coast and major cities of Korea. About one third of the plants are equipped with cold storage and freezing facilities. Their capacities per day are: ice making-approximately 1,500 metric tons, ice storage-24,000 metric tons, freezing-260 metric tons and cold storage 7,670 metric tons. The total annual production of ice can sufficiently meet the demand of the fishing fleet and fish markets.

The freezing of shrimp is a growing industry in Korea because there are large markets for the product in foreign countries.

Salting and Drying

Facilities for salting and drying fish in Korea range from cottage operations, in which the fish are nailed to the fences or hung out on strings, to the large commercial operations where the salting tanks may be as large as 8 feet high and 10 feet in diameter. The Office of Marine Affairs is planning to import modernized dryer facilities in order to prevent waste of marine products at peak seasons.

7. Marketing

Domestic distribution

Most of the Korean catch is sold by auction through fishing guilds at their fish markets. Between them and the consumer are numerous middle men, wholesalers and retailers whose percentage fees, plus transportation costs, increase the retail fish price by 100-150 percent over the price received by the fisherman. At each fishing guild is a consignment sales market (fish market) where members of the guild land their catches for sale. A modern fish market is to be installed in Pusan which is the largest fishing port of Korea. Installation of more fish markets with modern facilities is being planned. Retail fish markets will be also modernized with sanitary facilities.

Transportation, in general, controls the fresh fish market. By long distance hauling by rail, communities on the main line, and ports with main line connections, are fairly well served. Delivery, however, even by railroad is slow and the amount of fish that can be shipped is limited. Many ports and towns depend on boat & truck, for deliveries of fresh fish and other fishery products. Distribution of fresh these means is generally unsatisfactory, al suitable for salted, dried, canned fish an processed marine products. Processed products are available in practically eve store throughout Korea. In order to seafood promptly from the fishing port loss of the quality, the Government is pl to import some refrigerated cars to transp fish.

Exports of Marine Products

Marine products which is sec mining products in Korea in earning exchange play an important role in the r economy. The marine products whi exported to Japan, Hong Kong, Singapor China, Ryukyu, Ceylon and the United Sta of 25 species. The main species amo products exported are live fish, and dried ca which are mostly exported to Hong Ko Japan. Agar agar used to be exported t Kong, but at present mechanical agar-a exported to the United States, West G and Hong Kong. Fisheries exports promoted in the future because the Gove is making all possible efforts to expand markets and to improve the quality of f products.

8. Structure of the Fisheries Administra

Office of Marine Affairs

The Bureau of Fisheries was set organized directly under the Ministry merce and Industry when the Governmen Republic of Korea was inaugurated on 15, 1948. The Bureau of Fisheries was under the jurisdiction of the Office of Affairs on February 17, 1955 due to the of the Government organizations to u administration of marine affairs. The Marine Affairs is a semi-autonomous gov agency under the Ministry of Comme Industry comprising three bureaus, i.e., of Fisheries, Marine Transportation and lation. The Bureau of Fisheries is or into five sections:

General Affairs Section

Management of personnel, budg accounting, Government-owned proper and Regulations.

tration Section

establishment of fisheries policy, fisheries s, supervision of fishermen's organiza- heries financing, supply of fisheries and equipment, and fish net and rope

Section

irection of fishing, conduct of fisheries, ation of fishing grounds, study of produc- ishing gear and equipment, management onstruction, supervision of fishing port tion, and issuance of fishing licenses.

ng Section

pervision of general processing, foreign, n production, ice manufacturing and plant construction, production of fish d fish oil, issuance of licenses for manufacturing and management of f aquatic animals and plants.

uard Section

atrolling of fisheries conservation zone ection of beacons.

. Offices and Branch Offices

here are nine regional offices of marine ne in each province with the exception a Namdo Province, where exist two offices directly under the Central Office ne Affairs in Seoul. These regional d branch offices have fisheries sections ections, with functions similar to the Bureau of Fisheries.

Inspection Stations

fteen inspection stations are located in al areas, including the Central Fisheries n Station located in Seoul to inspect l marine products, investigate the g of marine products and check on d transportation of processed marine

Experiment Station

here is one large main fisheries experi- tion in Pusan and branch stations t Chumunjin, Pohang, Cheju-do, Yosu, nd Inchon. The stations have six vessels. Besides the stations, there fish hatcheries one at Chihae and the Chung-pyung. The Government has appropriated a large amount of funds for the stations this year since the stations play a very important role in improving the fishing industry. The two hatcheries are raising mainly carp and tilapia which were brought from Thailand five years ago.

9. Fisheries Cooperative Organizations

The organizations are incorporated to the articles of the Korean Fisheries Organizations Law. Their purposes are in general joint purchase of fisheries material and equipment, marketing member's catch, installation of joint facilities and financing. There are three types of fishermen's organizations:

Fishing Guilds

There are 168 fishery guilds at fishing villages or ports along the coast throughout Korea. These are essentially community fishing cooperatives for the procurement of fishing supplies and consignment and marketing of the catch.

Unions of Provincial Fishing Guilds

These unions are located one in each province except in Cholla Namdo Province where two unions exist; a total of 9 unions of fishery guilds are established throughout Korea. The unions make loans to individual guilds for conducting their activities in operations beyond the capacity of individual guild.

Fishery Associations

The fishermen (boat owners) who operate the same type of fishery also form Fishery Associations. The culturists or processors of marine products who conduct same types of production business also organize the fishery associations for their mutual interests. There are 18 such fishery associations including diving-unit fishery associations, motor dragnet fishery associations, deep sea fishery association, deep sea tuna longline fishery association, purse seiners' association, three set net fishery associations, sail dragnet fishery association, anchovy fishery association, fish culturist's association, oyster culture association, agar-agar manufacturing association and canners' production association.

The Korea Central Fisheries Federation

As a central body of the fishermen's organizations, the Central Fisheries Federation is

organized and located in Seoul. All unions of fisheries guilds and associations are members of the Federation. Aside from the functions of the guilds, unions of guilds and associations, the federation has established an insurance policy for fishermen to assist them when their boats meet sea disasters.

10. Deep-sea Tuna Long Line Fishing

M.S. CHINAM-HO of the Jaidong Industrial company made her maiden voyage to Indian Ocean in June, 1957 to participate in the demonstration fishing operation project under ICA aid program of Fiscal Year 1957. Fifteen days of fishing operations of the vessel resulted in catching approximately 50 metric tons of various species of tuna. The vessel also collected valuable data on the fishing grounds of the Indian Ocean. The vessel left again on January 21, 1958 for her second fishing voyage for the tuna fishing grounds off the Samoa Islands of the United States Territory. The Jaidong Industrial Company has made a contract with the Van Camp Company as to the fishing operation of the vessel and sale of its catch. The Vam Camp Co. has its canneries on the island. In addition to M.S. CHINAM-HO, the M.S. HAEYUN-HO left for Samoa Island for tuna catching.

11. Technical Training and Education

Korea has 15 fisheries educational institutions at present. The Pusan Fisheries College, on the coast several miles northeast of Pusan is the main advanced fisheries school in Korea. The college has five courses such as fishing, aquatic biology and culture, aquatic chemistry and manufacturing, shipbuilding and fisheries economics courses. It has approximately one thousand students.

There are fourteen other fisheries schools at the major fishing ports through Korea at the high school level with a total of over 4,000 students. These schools teach fishing techniques, seamanship, seafood curing or processing and fish culture. So far approximately 6,000 students have graduated from the school.

Various foreign aid programs have brought several fisheries exports to this country after the liberation and especially after the Korean War to help build and or rehabilitate various production facilities such as ice plan canneries, shipyards, etc., and to teach techniques.

The Bureau of Fisheries has been strong efforts to send Korean fisheries cians abroad to learn advanced techni foreign countries. Only four have so f to the United States to study and observe manufacturing, freezing, fishing operat fisheries management under the U.S. ICA program. In the near future another tr to participate for training in trawling un FAO/ETAP Fellowship program of 1958

The Office of Marine Affairs also short term training school within the to train technicians: a training school operation and handling of Diesel engine operated in Pusan.

FEDERATION OF MALAYA-1957

General

The fishing industry of the Feder Malaya has made rapid strides and longer be described as a backward industry. Mechanization and industri have proceeded apace to an extent developments may compare, albeit in a sm with those of the bigger nations.

The principal fishing ground exp local fishermen extend from inshore wa comprise a belt of not more than th miles of water round the Peninsula. Tra ly the inshore waters, especially thos Straits of Malacca, have been fished int with a great variety of gears including stakes, beach seines, boat seines and dr In the offshore waters there is an equall proven and productive gears, amongs may be mentioned the purse seine and long lines on the West Coast and the tr Malay lift net (pukat tangkok) and bo (pukat payang) on the East Coast.

There has not been any major typ gear introduced into Malaya, but there h modifications of existing gears to adj to the use of motor driven craft. T productive of these is the purse seine now used for catching the Malayan

*Note: The tables submitted with this report are omitted from the present document. T retained on the files of the Secretariat Secretary.

ubok, and the Malayan chub mackerel, :embong. A modified form of this net been used since 1956 on the East Coast anu and Pahang) for catching the anchovy, the ikan bilis. This modified ne is gaining popularity as it enables n on the anchovy shoals well out to sea, of having to wait for the shoals to come as is necessary in the case of beach r pukat tarek which are hauled in from h. In addition, mechanized craft have d with increasing success for the Malay he pukat tangkol, the Malay boat seine, t payang and the Chinese beach seine, t taubang or pukat kenka. Until recent fishing fleet never fished more than 35 om the coast, except on the rarest s. But today fishing craft are found egularly 65 to 75 miles away from their lechanization at sea is being followed similar developments ashore. Such nents as the use of mechanical ice at fish packing plants, the use of and hoists for bringing fish ashore, the frigeration and chilled ice-water storage ng fish from periods of glut to periods ge, and the canning of fish in multi- anneries all point to a healthy process tion. While the use of outboard n traditional craft is still widespread, elopment of healthy inboard Diesel- craft is gaining momentum and at the 57 there were 1,494 such craft licensed ating as compared with 996 in 1956.

eather conditions for the year under ave followed the normal pattern. On Coast, particularly in Kelantan and u, fishing activities were very limited anuary and February because of the However, conditions improved consi- om then onwards with the result that gher grades of fish, there is always a demand which will depend again on y position of these grades, rather than vailability of fish supply in general. or of consumer preference has always of great significance in Malaya where lation is diverse and types of fish are so varied.

was available throughout the country erage price of M$30 per ton to the In places where transportation was he charges were generally higher. The opening of the East Coast Railway stimulated the export of high grade fish from Tumpat to Singapore. Similarly, the opening of the Maran Road connecting the East Coast with Kuala Lumpur by a short route has stimulated the fisheries of North Pahang and Trengganu and lorries loaded with fish in ice are a regular feature on this road when the fishing season is open. Further, the improvement of road communication between Kuala Trengganu and Kota Bahru has also greatly stimulated the export of fresh fish from Besut and Kuala Trengganu to Kota Bahru.

The total landings for the year were 110,863 tons against 111,000 tons for 1956, the lower landings recorded for the West Coast being compensated for by increased landings for the East Coast.

Structure of the Industry

The basic structure of the industry has changed little, but there is now a growing awareness of the value of cooperative effort, a direct result no doubt of the new Government policy of encouraging the formation of co-operatives in all primary industries. On the whole it may be said that fishermen operate with borrowed money and the man who provides capital has control of the fish. He in turn, distributes the fish to the major consuming centers and the rural districts through consignment agents. There are a large number of registered companies owning boats and gears and employing their fishermen on a share basis; there are also considerable numbers of private boat owners and small gear operators who sell their catch to purchasing agents ashore, often closely linked with an advance payment system. On the North-West Coast, a "secret auction" or system of whispering tender prevails. On the East Coast there is a system of open bidding at the landing points on the beaches. At the major urban centers of Alor Star, fish landings for the whole of the East Coast from Kelantan to East Johore were higher than that for 1956. On the North-West coast, it was reported that the continued presence of jelly fish had spelled the failure of the bag net fishery. This coupled with a period of stormy weather due to the South-West monsoon, caused an appreciable fall in landings compared with previous years. In the South-West zone however, fishing conditions were satisfactory throughout the year, particularly with the drift-net fleet

of Malacca and Pulau Ketam; the latter were in fact reported to have doubled their catches as compared with previous years. The Malayan shad or ikan terubok again failed to appear this year and this together with the poor catches of Malayan chub mackerel or ikan kembong, led to great financial distress among operators of the purse seine fleet at Pangkor and Kuala Kedah. Indeed, it was anticipated that many nets would be laid up in 1958 if the poor fishing conditions, which began in 1956 and were attributed to clear water and changes in direction of currents, were to continue into 1958. The North-East monsoon set in early in November followed by strong winds and heavy seas, with the result that most of the fishing stakes off Southern Pahang and Johore were vacated very early by the fishing operators on these stakes. It will be remembered that similar exceptional bad weather conditions swept these coasts in November 1956 causing the loss of 53 lives among the operators of fishing stakes. As a result of this disaster a regulation has been introduced which requires the operating staff of fishing stakes off Johore and Pahang to vacate them before 10th November. This was a normal precaution which had worked well. Some relaxation of this ban, however, is required in the case of fishing stakes lying to the lee of islands off the Pahang and Johore coasts and stops were in hand to cope with these.

The average retail prices of the higher grades of fish remained fairly constant throughout the year whilst the lower grades showed a small downward trend in June, July and August, which coincided with heavy landings of the Malayan chub mackerel (ikan kembong) at Pangkor. This downward trend however was not maintained and prices for the lower grades thereafter rose to a slightly higher level compared with prices for 1956. It is thus clear that heavy landings of the lower grades of fish can only affect prices within those grades and that Ipoh, Kuala Lumpur, Malacca and Singapore, there are wholesalers who, by a system of daily telephone calls to their consignment agents, maintain a balance in the distribution phase of the trade. It is a common fallacy to describe the wholesale agents as forming a monopolistic fish ring. This could not be further from the truth, for the handling and distribution of fish in Malaya, where it is a highly perishable commodity, is a most competitive business. However, the physical handling and distribution is far from up to date.

The Salt Fish Industry

The salt fish industry on the Ea continued to find ready markets during t the bulk of exports being sent by s Kuala Trengganu and Kuantan to Si Considerable quantities too were lorry transport to Kuala Lumpur for distribution to the urban centers on t Coast. On the West Coast, the produ the Malayan chub mackerel (ikan ke was not sufficient to meet local demand and boiled kembong, hence there w surplus for preparation of salted k Boiled kembong continued to be i demand and with the expansion of refri and cold room facilities on the West C product was being marketed in all the towns and new villages.

Utilization

An analysis of the utilization, i fish from other territories and the e other territories shows that the Feder Malaya had a net available supply of piculs out of a total production in the tion of 1,862,503 piculs. Of the total production,348,449 piculs were processe salted and dried fish. Another 193,79 were utilized as agricultural fertilizer and duck food; 90,238 piculs of small were processed to make blachan, and piculs were utilized for making dried This gives a total of 829,983 piculs of taken from the total production for processed products. Fresh fish was from a number of places. Higher gra imported from Singapore to the e 34,144 piculs. Into Malacca and Po tenham and some of the nearby smaller total of 22,909 piculs was import Sumatra, the bulk of this fish consistin Spanish mackerel "ikan tenggiri" an terubok." Other sources including shipments brought in by sea and lorry s from South Thailand accounted fo piculs. The total imports of fresh f therefore 109,645 piculs. Exports we to Singapore and this amounted to piculs, the bulk of this fish was of th and lower grades, and is utilized large laboring population of the Colony. ported to other destinations outside th tion of Malaya was 329 piculs.

:ation

hilst the structure of the industry has ged to any great extent, in so far as cing of the industry and ownership of craft and gear are concerned, the increase in the number of powered boats has continued as is shown in the following table:

Landings Tons	*Number of Fishermen*	*Number of Gears*	*Powered Boats*	*Non-Powered Boats*
104,880	71,403	21,139	327	21,793
109,934	49,532	18,654	4,052	17,789
109,422	61,212	17,606	4,550	18,879
111,083	50,690	19,427	5,641	17,730
110,863	49,443	21,276	6,283	17,541

will be noticed that there was a con- duction in the number of non-powered l the number of fishermen, followed by ase in the number of gears. This that the efforts of the Department to the fishing effort of the fishermen is earing fruit. In the past there has much reliance upon a single gear to fishermen with their livelihood, but e past two years an attempt has been th some success, to persuade fishermen a series of gears, so that they may ir effort to the changing seasons. The of powered boats is about 27 per cent tal registered number of boats, but it noted that quite a number of the boats consist of very small craft in estuarine and very shallow in- ters, or which are engaged only in fishing and these do not offer a for mechanization.

features of mechanization in the zones

the North-East zone which comprises and Trengganu the most notable as the rate of mechanization which l unabated. Bigger boats are being engines with higher h.p. are being Outboards have practically given board Diesels in Kelantan, Besut and engganu areas. They are, however, g used in the Kemaman/Dungun area ly at those villages which lack safe es for the bigger types of engined f the types of Diesels in use the most s the Japanese Yanmar Diesel of 4 H.P. P. Of the British engines, Lister of P. are popular.

Mechanization came rather late to Pahang in the South-East zone, but even here the number of Diesel-engined boats increased from 17 in 1956 to 37 in 1957. Similar increases were recorded for East Johore. The number of outboard engined boats remained static.

On the West Coast, there was a general increase in powered-boats in Kedah, Penang, Perak, Selangor and West Johore. In Selangor there was an increase of 21 per cent over the number in 1956. Malacca and Negri Sembilan totals showed a slower rate of mechanization whilst the large increase in Selangor was due to rapid conversion of the Tanjong Sepat and Pulo Ketam drift-net fleet to power.

As a result of the degree of mechanization achieved there is now a great tendency for fishermen to move round the coasts following the seasons. Two purse seine (pukat jeroot) boats, one from Kedah and the other from Port Swettenham fished off Trengganu during the year, one condition being that the boats should operate in waters beyond the twenty fathom line and fish for moving shoals of the Malayan chub mackerel, the ikan kembong. Both boats failed miserably, the reason given being that the fish were in loose shoals. Fishing with the use of lures (tuas) to aggregate fish shoals appear still to be the only successful method in dealing with most of the pelagic species on the East Coast. It might be mentioned that these lures are widely used by Polynesian fishermen in the East Indian Archipelago. Similarly twenty-one bubu and handline Diesel-engined boats moved to the North-West zone from Besut and Kuala Trengganu before the monsoon broke on the East Coast in October. These boats based themselves in Penang and Kuala Muda and were

able to exploit the well known redsnapper (ikan merah) grounds to the West and North-West of Pulau Perak. These grounds have for years been the fishing grounds of Chinese longline fishermen from Penang, but are at present under-exploited because of a shortage of fishing crew. The present development of bubu-fishing with Malay crew from the East Coast is therefore noteworthy and indeed timely and deserves close study, especially as it is known that the grounds are also being fished during the North-East Monsoon by longliners based at Singapore. A powered sekechi from Kuala Trengganu operated fish traps (bubu-fishing) from Kuala Selangor during the year.

The rapid mechanization of fishing boats poses a number of problems particularly on the East Coast. There is a need for expert guidance to be given boat builders in the design of the hull and the installation of engines in order that full beneficial results may accrue to the industry. There is also an urgent need to evolve a suitable type of beach-landing craft for fishing villages on the exposed coasts. This latter question is important if the fishermen in these villages are to derive benefits from mechanization with Diesels. They have for the time being to fall on the ubiquitous outboard engine with its enhanced cost of operation. It is understood that a request under United Nations Technical Aid has already been submitted by R.I.D.A. for the services of a naval architect to assist in the design of suitable types of boats for the R.I.D.A. dockyard in Trengganu. On the question of suitable beach-landing craft, this department is currently in communication with the FAO Naval Architect, Mr. Traung, who has similar problems on hand for Ceylon, India and Pakistan. Another pressing problem is the need for shore facilities which must develop quickly. In many of the fishing villages there is also an urgent need to build suitable Jetties and other facilities to service these powered boats.

Fishermen's Cooperative Societies

The Federal Fisheries Committee whose report was accepted by the Federal Legislative Council in 1956, made two major recommendations. Firstly, that cooperation was to be promoted throughout the country in all of the industry and trade, in order to st thrift and capital improvement. Second a fund should be available to the Min Agriculture to provide capital assist cooperative societies. A sum of $3 mill been made available for this purpose an of it was used for the training of Assist guide in the education of fishermen in c tive principles and in the organizati running of cooperative societies.

A direct result of these recommen was that great effort was made to prom formation of fishermen's cooperative s during the year under review. It was because of similarities in the methods of employed and in the capital structure industry that a firm start be made in the East zone to include North Pahang Kuantan. Accordingly, after a month paratory training at the Petaling Cooperative College, the field staff Northeast zone were fully committed t ing staff of the Department of Coo Development in encouraging firstly the tion of fishermen's cooperative societi in each of the fishing villages, and in helping the assessment of the v various gears which were then poole capital assets of the societies. Thirtyon ermen's cooperative Credit and Ma Societies have now been registered North-East coast. These societies have themselves into the East Coast Fish Cooperative Transport and Marketing with Headquarters in Kuala Trenggan November and December this Union s pilot scheme for the joint marketing from the Kuantan area to the inland t Temerloh and Mentakab. Eventually Lumpur will be the main objective. O various difficulties the Union did no paying out loans under the Scheme o tance to fishermen through cooperative s until about September. By December Union had paid out $229,909 to 74 with a total of 377 fishermen. Distrib this payment by cooperative societies marized below:

Name of Society	*No. of group*	*Number of members*	*Amount of loans granted*
; Lumpur	11	33	$34,980
ang Telipot F.C.S.	7	53	31,500
Nanas F.C.S.	3	25	35,000
F.C.S.	2	32	30,700
ıwar F.C.S.	5	15	12,370
Takir F.C.S.	7	63	28,800
F.C.S.	3	24	9,430
Ular F.C.S.	28	76	22,537
F.C.S.	3	23	12,722
Rhu F.C.S.	1	8	11,300
Sebak F.C.S.	1	8	10,000
Besut F.C.S.	3	17	26,600
Grand Total	74	377	$229,909

Whilst full attention on the formation of n's cooperatives was focussed on the ast coast, a few fishermen's cooperative s on the West Coast which were in e before the acceptance of the Federal s Committee's Report, continued to i. These societies have not as yet l aid under the $3 million Scheme due rtage of the necessary trained staff to e the Scheme. The Fishermen's Co- e Society at Kuala Muda continued to but incurred a loss in 1957. The Malay tive Society at Kampong Pancher, Perak, was formed specifically for the farming les reported satisfactory progress. Its into boatseine fishing (pukat payang) has ever met with the success anticipated. In r the Sementa Cooperative Society, the hermen's Society in the State, continued e modest but steady progress. The was established in 1952 expressly for paration and marketing of shrimp paste. small factory and has been extremely ul in obtaining good prices for its in the Kuala Lumpur markets. The ishermen's Cooperative Societies in iembilan namely that at Pasir Panjang ok Kemnang continued to market their s' catches at fishstalls in the Port market. At Malacca excellent pro- as made by the Hengwha fishermen's e) Cooperative Credit and Marketing Ltd. The Society operated a fishing s purchase scheme for the direct pur- hemp twine from Italian manufacturers a commission agent. This was es- to save the Society some $10,000 a year. The Society also operated a fuel purchase scheme during the year, a contract having been signed with the Shell Company to supply the Society with 80,000 gallons of Diesoline per annum at the wholesale price of 58 cents per gallon against the retail price of 62 cents per gallon. Similarly the Society has successfully negotiated with the Malayan agent for Japanese "Yanmar" engines and the agent for Petter engines for substantial discounts which will be passed to the members. The largest single expenditure incurred by the Hengwha fishing fleet is the purchase of ice which totals some $7,000 per month. The Society is now looking into the question of building its own ten-ton ice-plant. A suitable piece of State land has, it is understood, been obtained for the purpose. The estimated cost of plant equipment and installation is $90,000 to which must be added $30-$40,000 for buildings and land.

Fishermen's Training

The Fishermen's Training Course in care and maintenance of engines and in helmsmanship which was started in 1953 with Rural and Industrial Development Authority funds and continued in 1956 with departmental funds, was maintained during the year. The course which was previously held at the Junior Technical Trade School, Penang, and the premises of the Local Masters & Gunners' Institute, Penang was transferred to the departmental workshop in Glugor in 1957; 42 Federation fishermen participated in two courses. Of these 16 obtained the Helmsmanship Certificate of Competency and 38 the Engine Repair and Maintenance Certificate. The small number of

passes in the Helmsmanship Certificate Examination was due to some of the trainees being under-age for the examination. A few were debarred either because of lack of the required sea-time or because of failure in the stringent eye test which necessarily includes that for color vision.

In addition to the above trainees, two members of the staff of Government Departments one from the Marine Department and one from the Telecommunications Department were accepted for training in engine maintenance and repairs. Both passed the examination.

Kelantan Fish Marketing Scheme

The Kelantan Fish Marketing Scheme at Bachok which was originally financed with a grant of $194,200 from the Colonial Development and Welfare Fund, but since taken over by the Department and run with Federal funds from the middle of 1956 continued during the year under the Deputy Manager who was directly responsible to the Director of Fisheries. The amount of fish handled was 1,176 piculs compared with 1,016 piculs for 1956. The Scheme, however, continued to meet with strong opposition from middlemen during the course of the year. Whilst the Scheme cannot be said to be a financial success, one of the chief aims of the Scheme, that of influencing fish prices so that fishermen in the Bachok area may obtain a fair price for their fish has been achieved. The Scheme branched out during the year into preparation of salt-fish, belachan (shrimp paste), budu (a local formented fish paste) and "bilis sauce" in anticipation of good sales during the monsoon months. However, owing to continued landings of fresh fish in good quantities throughout the monsoon months from fishermen based at Pulau Redang, the sale of budu and saltfish was poor. Similarly, although the shrimp paste produced was of high quality and its preparation was based on the same method as that used by the best manufacturers in Penang, sale was disappointing as the local Kelantan people preferred the less expensive, albeit lower grade, local product. Suitable markets will therefore have to be found for this shrimp paste on the West Coast.

The Scheme has now been in existence for two and half years, and although it cannot be considered a success, it has provided much insight into the intricate problems marketing in Kelantan. It is the intenti the building and other facilities afforded Scheme be eventually taken over by th Coast Fishermen's Cooperative Transpo Marketing Union when this is firmly estab

Relationship with R.I.D.A.

One of the recommendations Federal Fisheries Committee was that R should gradually cease to provide capital the fishing industry and that this sho taken over by the $3 million Aid S There has consequently been a taili in R.I.D.A. aid which was called upo in those areas where the $3 millio Scheme had not commenced operation. R.I.D.A. aid was given only Pahang, Kedah, Penang and Malacca, durin year. In Negri Sembilan R.I.D.A. ai continued particularly in fishponds, eleven new applications were dealt w the same time an intensive follow-up inv tion made by the Department has shown the past R.I.D.A. projects have had success. Of 42 ponds listed, 14 were r successful, 15 abandoned and 13 eith operated commercially or had been disp by sale or rental. Thus it may be stat approximately one-third of R.I.D.A. po jects have proved successful, one-thir totally failed and one-third maintained the level of commercial intensity. Of the pond projects, the two main factors resp for failure the lack of attention to predat control and insufficiency of fertilizer tre Out of a sample of 20 Malay projects than nine were found to be abandoned a two claimed success. The Chinese carp p however, invariably combine with pig b and they concentrate on the culture of carp. They all met with general succes of nine ponds, seven obtained success had grossed $4,000 or three times h amount.

In view of the varied success a no doubt a result of the lack of fund knowledge on the technical aspects culture among the Malay raayat, the ment continued with the pond culture c started in 1956. In 1957 a course o culture was held in Ampangan (Negri Se on 10th and 11th December and was a by 10 pond owners.

water Fisheries; Prawnponds and Culture

he entire coastline in the North-West articularly that of Penang, Kedah and Wellesley has been surveyed during in an endeavour to find a suitable site experimental prawn-pond. In general grove swamps in this region appear to igh for the purpose. As prawn pond tion involves heavy costs of bunding, it ely that private enterprise will invest dustry until it can be shown to be an c proposition.

rawnponds are, however, an important of Singapore fisheries, and it has been d that something like 230 tons of and fish are produced annually from es of ponds constructed from mangrove round the islands.

is therefore clear that there is tremen-ential for development of prawn ponds ederation, particularly in the mangrove Southern Johore, Selangor and Perak. e improvement in emergency conditions, eved that there is keen interest among ond operators in Singapore to extend ns into South Johore. If this is true it e welcome as it will help to initiate what me an important industry in neighboring s like Indonesia and the Philippines ousands of acres of mangrove swamps n converted into ponds for the culture s and fish.

he department has under its Develop-an a project for the setting up of a water fish culture station in Johore. uld help in accelerating the development ponds in the Federation.

n important postwar development in fisheries has been the culture of *granosa*, the Malayan cockle. It was out 1948, that the headman of Bagan , a fishing village off Kuala Jarum Mas, erimented in the sowing of seed cockles from the natural cockle bed at Kuala las, on the patch of muddy foreshore of his village. The experiment was uccess as the young cockles registered nal growth rates in the newly laid s compared with those in the natural nce that time the culture of cockles apidly throughout the mangrove areas of the West Coast, with the encouragement and advice of the Fisheries Department. The progress recorded in past years has continued.

In Perak there are now some 2,000 acres of muddy foreshore under cultivation and the bulk of the cockles consumed in Malaya are produced here. The cultivation of cockles has made an almost unbelievable difference to the general standard of living in the villages along the mangrove fringes over the past ten years. The people employed as collectors earn a better living than most fishermen and although the work is hard the income is regular. The estimated production for Perak for the last six years is as follows :

Production of cockle in Perak

(mainly from culture beds)

		Piculs
1952	...	27,030
1953	...	36,300
1954	...	32,670
1955	...	44,750
1956	...	78,309
1957	...	88,711

The areas under cultivation are the mud flats of Gula, Larut and Matang. For 1958, there is every indication that production will show further increases. In Penang too, cockle culture spread rapidly from 1950 onwards, first with imported seed cockles from Kuala Selangor and Kuala Jarum Mas and later with supplies from the natural beds of Kuala Jalan Bahru and Sungei Pinang on the West Coast of the island. To date, temporary occupation licences have been issued for all available suitable sites on Penang Island and the culture has now spread to Pulau Aman and to the Province Wellesley coast. The total area under cultivation in Penang is estimated at 600-700 acres with an annual production for 1957 of 20,000 piculs. Apart from these there is also a small production from the natural grounds off Selangor, particularly Beting Gopal. Thus the total production of cockles for the Federation for 1957 is estimated at some 110,000 piculs, a figure more than twice that recorded for 1938 (last published data available before the War), which stood at 43,000 piculs. The bulk of this production was consumed in the major towns of the West Coast and in Singapore. A small quantity was exported to the East Coast via Kuantan. In 1956, the recorded export of

shellfish, which consisted mainly of cockles, to Singapore was 2,973 tons valued at $502,425 wholesale. The corresponding figure for 1957 is expected to be some 3,700 tons. As a direct result of this increased production, the canning of cockles in soya sauce which was demonstrated by the Department at Kuala Kurau before the War, was taken up by two canneries, one in Penang and the other in Singapore. The Singapore cannery drew its supplies of cockles in the form of cooked cockle-meat packed in ice, from Kuala Kurau.

The extension of cockle culture to other States has received attention, both at policy level and on the ground. In the North-West Region four trials were carried out, namely at Kuala Kedah, off Tanjong Dawai, at Kuala Perlis and at Kuah, on Pulau Langkawi.

It was found that seed cockles grew at a phenomenal rate at Kuala Kedah but the area for cultivation was limited. Further trials will now be made on the exposed sea-shore to see whether wave action during the South-West monsoon will allow of this development here or not. Tanjong Dawai was a failure as few live cockles were recovered and they were generally in poor condition.

Kuala Perlis was suitable but again the sheltered area available is limited. The problem here is the same as in Kedah, i.e. trials will need to be made to see if the exposed fore-shore along the coasts can be utilized. Kuah registered a failure as few live cockles were recovered.

In the South-West zone, seed cockles were sent out late in the year from Penang to Sementa off Selangor, but it is too early as yet to say if the experiment will register success. Two attempts were made to send seed cockles to Johore during the year. Both met with failure as the seed cockles died on the way.

In the South-East zone, two experiments were started of Tanjong Lumpur near Kuantan. In the first, the seed cockles sent from Penang were destroyed by rays as a lot of crushed shells were recovered. In the second, the seed cockles showed good growth until the onset of the monsoon bringing with it a huge influx of flood waters. The cockles were discovered to have been killed by this influx of fresh water. It is clear therefore that in the case of the Kuantan estuary and other
locations on the East Coast, cockle
can only be successful in the period be
the monsoons. This raises the probl
having to import seed cockles every yea
the West Coast. However, since cock
marketed at 30 cents a katty in K
against 10-15 cents a katty on the West
it may yet be an economic proposition
a cockle industry on the East Coast ba
regular imports of seed cockles from th
Coast.

Fresh water Fisheries

The additional staff recruited for
Water Fisheries in 1956 enabled a muc
extensive program of work to be
out in 1957 than was previously possibl
the additional staff, one junior fi
assistant was posted to Malacca, an
were posted to each of the States of Tren
Pahang and Negri Sembilan to un
advisory and survey work and the stoc
open waters in those States. This wo
produced a clearer picture of the poss
and limitations of fish culture work i
areas and has resulted in renewed inte
the rearing of fish. The remaining fres
staff continued to operate from the Headq
at Penang where they have continue
survey and extension work in Nort
Malaya and have carried out further
stocking ponds, irrigation schemes an
The first indications of success in these
ments appeared during the year as Sep
(Trichogaster pectoralis) appears to have
shed itself in the Kubang Pasu canal
in the North-West, whilst in the Sou
Tilapia mossambica has established it
Gedang Tebat near Sri Menanti, a
swamp adjoining padi fields. It is r
that *Tilapia* are now regularly seen i
fields. In addition, Sepat siam ha
successfully introduced into Sungei Bal
sawaks in Johore. In all a total of
Sepat siam *(Trichogaster pectoralis)*,
Tilapia mossambica, 90 Kalui *(Osphronem
my)*, 4,270 Lampam Jawa or Tawes
javanicus), 50 Ketutu *(Oxyeleotris marm*
100 Chow Hu *(Ctenopharygodon idell*
1,280 Lee Koh *(Cyprinus carpio)* were dis
during the year, several more varieti
had been distributed in 1956. The
of Lampam Jawa or Tawes and of L

ere distributed are of particular signi-
s the breeding of these two types of
carried out at the Tapah Federal Fry
Station for the first time. The depart-
o sent 380 Sepat siam and 32 Kalui
Guinea at the request of the Australian
ent in order to help in the establish-
fish culture there. Similarly 200 Sepat
ere sent to the Central Fisheries
ent, Ministry of Food and Agriculture,
ent of Pakistan on 10th July 1957 at
est of ICA through the U.S. Consul in

rther importation totalling 10,000 *Catla*
y were made during 1957 in order to
with observation studies on this fast
fish. In addition to the above in the
rt of the year a start was made on the
and re-stocking of abandoned mining
ith fast-growing fishes. This work
the elimination of all predatory fishes
e pools, which are potentially a very
g source of fresh water fishes for the
pulation in the tin mining areas. A
ecruited Fisheries Officer (Research)
ut a series of experiments to test the
of various insecticides, namely "Shell"
"Shell" Dieldrex and "Shell" Aldrex
ing ponds of fishes and laboratory
vere successfully applied in the field.
ining pools in Kaki Bukit (Perlis),
and Batu Gajah, of a total area of 8½
ere cleared of predatory fishes and
ntly stocked with *Tilapia* and *Puntius*
.

s part of the Department's policy to
the services available to persons who
rested in fish culture, land has been
near Kuala Kangsar for building a
l Fry Breeding Station from which fry
distributed and at which experiments
carried out on the spawning and rearing
fish from the nearby Perak River.
leral Fish Breeding Station at Tapah
extended and goats and Sindhi crossed
ave been introduced as a source of
for the ponds.

of fish ponds, mining pools

survey of existing fish ponds and
pools in the district of Larut and
Kuala Kampar, Temoh, Tapah, Bidor
g Di-Awan was made during the year.

Fish Breeding

The techniques of spawning the Common Carp and *Puntius javanicus* acquired by the four Junior Fisheries Assistants in Indonesia, where they were sent to undergo a fish culture course, were demonstrated successfully at the Tapah Fish Breeding Station to other Fisheries Assistants who had not gone overseas. At the Bayan Lepas farm, Penang, local pond keepers were introduced to the Indonesian method of breeding the common carp.

The breeding of *Puntius javanicus* was carried out successfully during the year for the first time at the Tapah Fish Station. One male and three females were employed and a total of 29,300 fry was successfully reared to 2 in — 3 in for distribution to pond owners.

Course on Prawn Pond operations

All the Fisheries Assistants (Fresh water) were given a course on prawn pond operations in Singapore from 21st-27th June 1957 by Dr. Tham Ah Kow, Chief Fisheries Officer, Singapore.

Culture of Udang Galah

(Macrobrachium carcinus)

The Department has during the year carried out experiments on the culture of Udang Galah, a freshwater prawn known scientifically as *Macrobrachium carcinus*. This much sought after prawn is found in most of the rivers and swamps of Malaya and fetches very high prices in the local market. The experiments have not been a success and will be continued in 1958.

Assistance to ex-Special Constables and others

The Department assisted a group of ex-Special Constables at Kampong Sahom, Kampar, in reconditioning old fish ponds which were excellently laid out by the previous owners. Labour was diverted from the Fish Station at Tapah for the work. On completion, the ponds were stocked with *Tilapia mossambica*. Kalui, common carp, *Puntius javanicus* and Chinese grass carp and were then handed back to the ex-Special Constables to look after. Staff from the department continued to visit the ponds and to advise on the management.

Field staff of the department also rendered assistance to a pond owner at Baling to rid his ponds of predatory fish and to restock

it with *Puntius javanicus*, common carp and Kalui.

Experimental work carried out during the year

(a) Fishing experiments

During 1957 all the Departmental vessels were fully engaged to the limits of the financial allocation made for operating them. Besides routine survey and inspection work of varied program of experimental work was carried out. In the North-east zone **M.V. TENAK**, prior to being transferred to Penang, was engaged in exploratory drift-net fishing experiments in deeper waters than fished by local fishermen. The vessel was also used to encourage longlining among Malay fishermen in the waters beyond Pulau Perhentian, with considerable success. Following its transfer to the North-west zone, **M.V. TENAK** was used for investigations into the possibilities of using chemicals as a means of driving dolphins away from areas where pukat jeroot was being operated as dolphins cause considerable damage to the nets when they attack the catch.

M.V. TONGKOL continued the work on bubu-fishing in waters 40-50 miles from land. This work started in 1956. The difficulties in finding suitable floats and markers for traps were finally overcome and the necessary work preliminary to carrying out comparative experiments between traditional and modified bubu (fish pots) with a view to improving the efficiency of traditional traps has been completed.

In the North-west zone comparative experiments to determine the advantages of nylon fishing nets over the traditional cotton and ramie nets in drift-net fishing were carried out and will be continued in 1958.

(c) Dolphin meal

During the year a total of twelve small dolphins (average body weight just over 30 katties each) were received from Kedah where they were caught by pukat jeroot. These were processed in the Department's fish meal plant. A fairly simple method of processing them was found after a first trial, the bodies are flensed and then butchered, the meat being cooked then boned roughly, minced and sun dried; the dried minced meal can then be put through a hammer mill. The bones, with attached meat are sun dried, crushed and put th the hammer mill. The two processes, alt simple involve quite a lot of labor. The meal is apparently suitable for animal fe the Agriculture Department is carryin feeding trials. Two analyses of this mea made; they were roughly the same a results of the second are given below:

	% dry basis	*% as re*
Moisture	—	7 7
Ash	3.66	3.3
Protein	85.99	79.3
Fat	6.59	6.0
Analysis of ash	% on ash	% as rec
CaO	7.20	0.2
P_2O_5	39.51	1.3

The estimated wholesale price f meal is 46 c per katty.

The bone meal is reported as being s for use as a fertilizer as regards nitroge phosphate content but as lacking in potas

The Department obtained a yi approximately 15 per cent by body wei meat and 2 per cent of bone meal. It appear therefore that one picul of raw d is worth just over $ 7.00 when processe process is therefore not an economic poss Oil from the blubber is a possible add source of income but the income fro would be small and it is unlikely tha would make the processing of dolphins eco ally possible.

(c) Fish Icing Experiments

A series of experiments designed the marketing side of the industry's repeated statement that iced fish inv loses weight in transit and storage were out on two of the cheaper types of fish kembong *(Rastrelliger Sp.)* and ikan geru *(Pomadasys hasta.)*

The fish was weighed before ici then packed in boxes similar to those in c use in the markets using a similar technique. The fish was then draine weighed at six hourly intervals.

The experiments showed that as l the fish remained in good fresh conditio was a gain in weight of roughly 5 per most cases. While there was considerab

these increases, in no case was a loss in recorded.

n order to follow marketing practice as as possible the fish was iced only after (up to eight hours after it was caught). ently there was some deterioration in and some of the weight increase was r about 24 hours in ice.

is however apparent that provided that properly iced as soon as possible after there will be an increase in weight the time of landing and the retail sale ery little fish is more than 36 hours out ea when retailed.

stration of fishing stakes

ishing stake is one of our most important the North-west, South-west and South- ions. Its operation, however, leads to isputes with net fishermen, as derelict e left on the seabed and these foul the The settling of disputes between these ups of fishermen has therefore been a al problem to the Department. In ity with a recommendation of the Fisheries Committee, steps have been y several States during the year, with vice of the Department to improve on the licensing of fishing stakes. In there is now a limitation to the number ces issued and an increase in the amount sit held against a licence for removal of poles.

n the South-west zone, particularly off r, there is an acute shortage of mangrove r fishing stakes and this problem is likely d to other areas. The Department has ently approved the experimental trial of anese set-net (Otoshi-ami). One of these perated by private interests off Selangor off Kedah. It is felt that should this e successful it will pave the way for the elimination of fishing stakes and all ncommitant administrative problems.

g Staff

taff of the Department have been sent ning locally and overseas. A number of s Assistants underwent a course on co- e development at the cooperative College ing Jaya. Four were sent overseas for a ture course in Indonesia. The Deputy r of the Kelantan Fish Marketing Scheme attended an FAO/ETAP course of training on Fishery Cooperatives and Administration in Australia. Those Fisheries Assistants having to deal with administration were sent to the Police College at Kuala Kubu Bahru to undergo a course in court procedure and the criminal procedure code. Canadian Colombo Plan Aid was secured for sending a trainee for gear technology to be eventually posted as Principal of the Marine Fisheries School, and for sending two Fisheries Assistants for a course on Fisheries Cooperativesan d Administration in Canada. These trainees are expected to leave for training in early 1958.

Prevention of Loss of Life at Sea

A scheme for the rescue of fishing boats was introduced immediately before the outbreak of the monsoon in October. Under this scheme fishermen were asked immediately to notify the Police of cases of boats capsizing or missing at sea. Further, fishermen were notified over the radio of impending strong winds. The scheme has been successful in so far as the relaying of news by the Police was concerned. Because of the heavy surf at river mouths, exits of motor boats on rescue had not always been possible. One life was reported to have been lost as a result of the monsoon. This happened to a pukat tangkol boat which capsized off Kuala Pahang.

Development of Offshore Fishing Bases

The rapid development of mechanization in Kelantan and Trengganu has enabled fishermen to fish during a great part of the monsoon months. There is now an urgent need to develop offshore bases from which they can operate. The Pulau Redang group of islands have long been frequented by fishermen from Kelantan and Trengganu during the monsoon months and as many as 500 fishermen and their families have recently been over. To cope with this development two long-houses were constructed during the year under the supervision of the Fisheries Officer, North-east, on Pulau Pinang in the Pulau Redang group. The project was financed with State and Federal funds. Further development in the form of a jetty, ice and fuel store, and net and fishdrying racks is required and this has been provided for in the 1956-60 Development Plan. Apart from Pulau Redang, another island fishing base which should soon be developed to serve Pahang and East Johore is Pulau Tioman. The Department

is currently making investigations into requirements on this island.

Colombo Plan Aid

Canadian Colombo Plan Aid has been enlisted for the supply of refrigeration equipment for five ice-factories on the North-east coast. These factories will be established at a number of centers to serve fishermen's cooperatives and will eventually be taken over and run by the Cooperative Marketing and Transport Union, which has already been established. Supplies of cheap ice should go a long way towards furthering the objective of economic disposal of East Coast fish in the urban markets on the West Coast.

Visits Overseas

The Director of Fisheries accompanied the Minister of Agriculture on his official visit to Japan in September, as the guests of the Japanese Government. They were shown various aspects of the Japanese fisheries but concentrated attention chiefly on tuna-fisheries and fisheries education in general. A direct result of this visit is a plan to introduce tuna fishing into the Federation of Malaya. Negotiations are in hand for establishing the necessary facilities on Penang Island.

Research

The Government of the Federation contributed to the Singapore Regional Fisheries Research Station up to 31st March 1957 when the Station was closed down owing to lack of financial support from the participating territories.

The Fish Culture Research Institute at Malacca was completed during the year and was officially opened on 21st August 1957 by the High Commissioner, Sir Donald MacGillivray. It is a regional station to serve all British territories as well as the Federation of Malaya and these territories will be asked to contribute towards the recurrent costs, the capital costs for the buildings and the ponds which amount to £250,000 having been met from Colonial Welfare and Development Fund. Since the date of independence, administration of the affairs of the Institute has been transferred directly to the Secretary of State for the Colonies. Dr. C.F. Hickling, Fisheries Adviser to the Secretary of State, arrived in Malacca in November and is now the Acting Director of the Institute.

The research section of the Headqu of the Department which was kept in abe pending development of the Singapore Re Fisheries Research Station and the Fish C Research Institute was resuscitated at the of the year by the filling of three Div posts with locally born Honors gradua Science from the University of Malay London University. At the same tim Division I post of Distribution and Mar Officer was filled by an Asian who is an H graduate in Economics of the Univers Malaya.

Cockle Research

During the year the temporary Re Development Officer appointed in late continued with his study in Penang on pr associated with the cockle industry. H made population studies, both at the c beds and the natural beds and taken ph and chemical observations such as tempe and salinity. Biological observations on g gonad development, spatfall and tolerat salinity ranges have also been made. bottle experiments have been conduc determine the pattern of the tidal drifts in to prove or disprove the assumption th natural beds on the West Coast of F derive their spawn from the culture beds East Coast. The Officer has since been ap ed to one of the permanent research po the Headquarters establishment.

Research on Piscicides

The extensive program which the c ment initiated for the stocking of d mining pools with desirable types of food poses the problem of eradication of predato such as aruan *(Ophiocephalus* sp*)* and *(Clarias batrachus)* both of which are i fauna of these pools. Experiments were fore conducted to find a cheap and e piscicide. The Chinese pond keepers use of tea seed cake and derris root (tub the purpose. However both are expensi cheap and effective piscicide has now found in "Shell" Endrex at a concentra 0.007 p.p. million. This is now exte used by the Department for the purpos is most economical.

Items of General Interest

During the course of the year, the a significant reduction in the number of

ing from Port Swettenham and Malacca
e fresh fish barter trade with Sumatra.
is particularly so with operations from
wettenham.

Nylon fiber or a mixture of nylon and
synthetic fiber is now used exclusively
rift-net fishermen from Pulau Ketam.
catches have more than doubled previous
landing and they attribute it to the new
ese synthetic drift-nets.

A conference of Division I officers of the
uarters staff and the Chief Fisheries
r, Singapore was held in December. The
rence was opened by the Minister of
ulture and was held to discuss the imple-
tion of a program for the study of the
lliger (kembong) fishery based on that put
rd by the Indo-Pacific Fisheries Council.

The Director of Fisheries attended the
cific Science Congress held in Bangkok
vember-December.

During the year the Department took
a number of civics courses and members
staff visited all parts of the country to
dvice and demonstration on all aspects
Department's work.

The Kedah Fish Committee appointed
State Government consisting of Govern-
Officials and Representatives of the Fishing
ry completed its report on the present
of the fishing industry in Kedah with
mendations for improving conditions, and
eport has been submitted to the Kedah
nment.

Mr. M.L. Parry, Fisheries Officer, Federa-
f Malaya, spent six months on a survey of
hore fishing industry before his retirement
the Malayanization Scheme. His report
w under consideration by the Johore
nment.

anization

Three senior officers of the Department
ing the Director retired during the year
the Malayanization Scheme. Four local
s with Honors degrees in Natural Science
Economics have been recruited to fill
cies on the Headquarters establishment.

cial Provision

The total cost to the Federation of Malaya
nually recurrent expenditure and personal emoluments of the Pan-Malayan Department of Fisheries was $645,752. The amount voted for the Regional Marine Research Station as the share of the Federation of Malaya was $73,371, making a total of Federal experditive of $719,123. There was no State expenditure. The revenue collected in respect of fishing, fishing gear and boats etc. was $288,247.

Statistics The detailed tables submitted with this report are omitted from the present document. They have been retained on the files of the Secretariat Secretary.

FEDERATION OF MALAYA 1958

(January - August)

Essential statistics covering the whole of the Federation such as numbers of gears in operation, number of fishermen, and boats have not been compiled and will only be available after the end of 1958, when the annual report of the department is written. However the salient features for the period are as under:—

Production

The most important feature is the change-over from traditional ramie drift-nets in the fishery off Selangor, Malacca and Johore to Japanese synthetic fiber drift-nets of the Tavilon-nylon type. These have increased landings substantially in respect of this gear, thereby causing an appreciable drop in the prices of fish normally caught by this gear namely *Scomboromorus* Spp. and *Chirocentrus dorab*. However the increased landings which were then double their previous landings for the same period, more than compensate for the lowered prices.

The change-over started from late 1957 and by August 1958, a fleet of some 1,600 units of drift-net boats changed over to Japanese synthetic fiber nets off Johore, Selangor and Malacca. The total capital involved in this replacement is of the order of well over $2,000,000 all of which have been provided by the industry itself without Government assistance.

Mechanisation

The increased income arising from increased catches has stepped up mechanization of fishing boats in these areas and at the end of August some 350 new boats with inboard Diesel and about 150 boats with outboard engines have been registered.

Fishermen's Cooperatives

A further sum of $470,000 was released by the Federation Government for loans to Fishermen's Cooperative Societies on the East Coast. A number of Fishermen's Cooperative Societies have started to market their catches jointly in the major towns of the East Coast.

Fishermen's Training

Courses in navigation and engine maintenance and repairs have been continued.

Researches

The Research Division of the Department has continued with its studies on the following problems :-

(a) Cockle culture.

(b) Stocking of disused mining pools with desirable types of fishes.

(c) The *Rastrelliger* fishery.

(d) Salinity pattern of the North Malacca Straits from Angsa Bank to Penang from samples collected regularly at Lighthouses.

Fresh water Fisheries

A survey is being carried out on the numbers and size of fish ponds and also the types of fish reared, throughout the country. So far some 700 ponds have been catalogued.

Research on Piscicides

Shell "Endrex" which was found to be such a cheap and effective piscicide was used extensively during the year for clearing disused mining pools and ponds of predatory fishes mainly *(Ophiocephalus* and *Clarias)*. The trade preparation "Endrex" contains the active principle Endrin at a concentration of two lbs Endrin per Imperial gallon. This "Endrex" is used on ponds and mining pools, at a concentration of 0.008 p.p.m. of Endrin and was very effective. Its cheapness can be gauged by the fact that a pool of about 10 acres in extent and varying in depth from 1 to 22 ft. needed only $84/- worth of "Endrex" to poison it.

A total of 65 mining pools of a total acreage of 108 acres have been treated with "Endrex" and stocked with *Puntius javanicus* and *Tilapia mossambica.*

In many areas these pools are regularly fished and *Tilapia mossambica* ar appearing in the village markets.

Further stocking will be carried.

Marketing Section

The marketing section of this D ment has carried out a Federation-wide on the movement of fresh fish supplies. survey team consisted of the Distributio Marketing Officer as head, a Fisheries As Special Grade, and two Statistics Clerks the Headquarters. The team was also a by Statistics Clerks and a few Fis Assistants in respective Fisheries Zones. team started out on 5th May, 1958 and about two and a half months to compl field work.

The daily data collected were showing amount of fresh fish handled b wholesalers or consignors in the main r ing and producing centers in the Fed over the month of April 1958. These data were obtained from the receipts an records kept by the wholesalers or/an signors themselves. They were then tran on to two forms specially prepared f purpose by the Department. These da now in the process of tabulation by the quarters staff of the marketing section tabulations when completed will sho following:-

(1) Fish supplies handled by so wholesalers in such and such from April 1st to April 30th by sources of supply in ka piculs.

(2) Fish supplies handled by so wholesalers in such and center from April 1st to 30th, 1958 by types and sou supply.

(3) Average quantity handled b wholesaler in such and such during the month.

(4) Re-consignment by so many salers in such and such ce destinations.

The survey is expected to yield mental information regarding the volu fresh fish trade (over a period of one

s through the wholesale fish markets Federation; hence the importance of holesale center and the directions of rements. The quantitative data thus from the survey will provide a basis dies of marketing problems in the ron.

NETHERLANDS NEW GUINEA

here have been no reports of major nents except that an active program of craft mechanization is being imple-

sing native dugout canoes, outboard have been fitted in a number of cases use of this means of propulsion has in an appreciable increase in the es of fish caught.

program covering the improvement of fishing gear, exploration of fishing and an intensive survey of the pearl sheries is being implemented.

PAKISTAN

he construction of the Karachi Fish is well-advanced and it is expected to leted by 1960. Modern facilities for ding and handling, cold storage and ng are being provided as well as nents for boat and engine repair and ance.

consignment of 70 Diesels for installa- fishing boats has been received and n important step forward in the vessel zation program.

n East Pakistan arrangements are in conduct a three year survey of the grounds of the Bay of Bengal. A in. exploratory fishing vessel is under tion.

roblems of fresh fish marketing in are being resolved through the installa- two cold storage plants and the con- n of 22 modern-fish stalls appropriately ed.

pproval has been granted for the con- n of a Marine Biological Laboratory on achi sea-coast to study marine fauna research into the problems connected e development of the fisheries and industries of the area.

There is a rapidly growing awareness among the fishermen of the qualities of nylon and related synthetic fibers for fishing nets. The present demand is in excess of the amount of foreign exchange which can be allocated for the purchase of these materials.

Reclamation of Derelict Water Areas in East Pakistan *(by Dr. Nazir Ahmad, Director of Fisheries, East Pakistan)*: To combat the effects of diminishing supplies of fish and production from inland waters at less than the maximum sustainable yield, the Director of Fisheries of Pakistan has initiated a scheme for the rehabilitation and development of derelict inland water areas. The scheme is expected to extend over 5 years at a cost of Rs. 7.7 million and to bring into production 15,000 acres of derelict water. Estimates of area expenditure, production and revenue from 22 of the 90 unit areas are listed, totalling 6,282 acres, with a yield of 55,056 maunds, valued at Rs. 1,183,017/- for an expenditure of Rs. 897,378/-.

Formerly plentiful, fish is now getting scarce in East Pakistan. The natural result is that the consumers, who love to take fish with rice are forced either to eliminate it altogether or to effect drastic reduction of this item from the daily dietary. In East Pakistan with its extensive network of rivers and streams, *bheries*, *beels*, *baors*, *ponds*, *barrow-pits*, paddy-fields and estuarine creeks, there is immense scope for developing fisheries. According to a preliminary survey carried out by the Directorate of Fisheries, there are 239,135 impoundments, including 4,016 *beels* (inland lakes). Some of these water areas are from 50 to 60 square miles.

For various reasons, the production potential is not being achieved. Of fish producing waters 95,029 ponds and 2,045 beels are lying derelict, and the rest are not maintaining maximum sustainable yield due to faulty management. These water areas which could have contributed considerably in fighting the food shortage are now lying fallow and aggravate the spread of water-borne diseases.

The Directorate of Fisheries is executing with success a number of schemes aimed at increasing fish production. Recently the Directorate has started operation of an ambition scheme to extend over 5 years and to cost Rs. 7.7 million, under which it is proposed to reclaim 15,000 acres of derelict water area.

For administrative purposes the entire area has been divided into 90 units, each comprising about 160 acres. Work on 8 units was started last year, 40 units are being taken up this year and the rest will be reclaimed during the next year. The unitwise basis of the working program is meant to ensure more methodical distribution of work to obtain the best economic results. Moreover the units will be distributed in such a manner so that all areas of East Pakistan get equal attention in fisheries development program.

Each unit will be commercially self-sufficient and economically independent. The expenditure and income have been so distributed among the units that the success or failure of a particular unit will not vitally effect the working of the other units and the numb units can be appropriately increased o creased without substantial change in the scheme.

The expenditure incurred in the e tion of the scheme is expected to be recc with profit by the sale of the fish produc these fisheries. After the first five year work will be continued and with the development phase over, the expenditur decrease resulting in greater profit. scheme envisages production of 270,000 m of fish valued at 8.1 million rupees at the conservative estimates.

A brief resume of the units is below:-

UNITS UNDER DEVELOPMENT

1957-1958.

District	Unit	Area acres	Expenditure Rs.	Production (est.) maunds	Estim Revenue (to 1
Jessore:	Bahular Baor	645	134,138	5,400	162.
	Joydia Baor	535	89,669	4,000	120.
	Habulla Rustampur Baor	76	47,030	1,750	56.
Dacca:	Naryanganj	18	24,450	1,006	35.
Bogra:	Raktadaha Beel	500	83,076	6,600	99.
	Narail Beel and Shakharia danga	150	43,492	2,700	48.
Rangpur:	Bamandanga Beel	70	25,036	1,065	36.
Kushtia:	Chand Beel	100	22,700	615	24.
	Ganges-Kobadak Lake	33	15,318	875	26.
	Chandona Doha	70	18,500	516	22.
	Bhanderdah	180	36,544	850	38.
Mymensingh:	Shampur Mora Beel	230	41,235	1,665	49.
	Baleswar-Kutiakuri Beels, Chowka Baor	100	17,844	850	25.
	Diara Nadi	200	41,424	1,650	57.
	Sharbamangal Dova, Betal and Khama Beels	170	26,822	1,400	42.
Dinajpur:	Dinajpur	12	1,500	90	3.
Sylhet:	Fateganj Beel	170	22,680	3,000	36.
	Anduganj Beel	270	36,284	4,200	50.
	Koibara fishery	83	14,916	1,600	19.
	Palui Beel	1,700	91,470	9,000	135.
	Aralikona Beel	870	67,284	5,000	75.
	Moragong fishery	100	15,966	1,200	21.

PHILIPPINES

sheries production is reported to have
from 254,000 to 404,000 metric tons
and 1957 respectively, including both
er, brackish and marine products.

ans have been completed for the
tion of the extended program of research
fisheries developed under the guidance
/ETAP expert.

e increasing catch has stimulated further
in the establishment of modern fish
s.

extensive Raw Material Resources
concerned with primary products,
, timber, agricultural products and
products is in progress as a coordinated
tween the several government depart-
ncerned.

pplementary to the important *Chanos*
ndustry, the Bureau of Fisheries has
ed a "Fry Bank" program to permit
ring and development of lakes, rivers
r public waters where there is evidence
ion.

ne Government's fisheries training
is expanding and a number of
nados" have been sent to USA and
r training in biology, gear construction
repair and maintenance of electrical
ids and other subjects.

eliminary studies on pond culture of
fish locally known as "samoral" or
reveal excellent possibilities for
ent.

proved methods of oyster culture are
g production in the rich oyster grounds
Bay.

THAILAND

bstantial progress has been made by
i fisheries industry during the past
Mechanized boats increased from 121
o 1,082 in 1956; the quantity of gear in
e Gulf of Thailand increased from 4,148
9; the annual catch increased from
metric tons to almost 213,000 tons;
f salted fish soared from 2,882 tons to
),000 tons.

he Government's programs of stocking
aters has likewise progressed remarkably-the number of fish distributed to ponds and lakes increased from 112,000 in 1947 to about 6 million in 1956.

Although the Gulf of Thailand has yet to be thoroughly surveyed for its potential commercial value, experts believe that on the basis of present catch from peripheral areas the entire Gulf holds great promise. Plans are being finalized for a comprehensive survey of the Gulf, contracted through ICA and the Scripps Institute of Oceanography on the request of Vietnam and Thailand. The Japanese are already at work in the Indian Ocean off the West Coasts of Thailand and have sent in vessels, equipment and experts to develop the fisheries of the continental shelf whose edge is about 60 miles off the coasts.

It is hoped that per capita consumption which is now about 20 lb. per annum, can be raised to 35 lb.

About 600 people in the village of Nongkorn in the Ubol Province recently took part in an experiment that may have a radical effect upon the diet of this particularly protein-hungry part of Thailand. Under the supervision of FAO nutritionists, 150 families received a daily ration of 15 g. of fish meal. They were instructed in its use and given simple recipes supplied by the Thai Health Department.

The flour, which also is a good source of calcium, is produced at Chumporn, 468 miles from Bangkok, by the Fish Marketing Organization, and is made from "pla tu" and some "slipmouth" fish. The factory can turn about 28 tons of fish into 5 tons of flour every day and can use the smaller fish which previously had little or no market.

Action is now being taken to provide shortwave ship-to-shore radio services for the fishing fleet and to assist in the provision and operation of modern fish-finding equipment on the fishing vessels.

Plants to develop and extend facilities for fisheries training at Kasetsart University are under consideration, and Fisheries Department's training program for fisheries operatives in navigation safety at sea and engine operation, repair and maintenance is continuing.

Facilities for training in boatbuilding have been installed and are operating at Ban Pae Marine Station.

UNITED KINGDOM

BRUNEI

Little information is available concerning the development of the fisheries industries of this State. Data on production and on personnel and equipment engaged in the industry do not appear to have been compiled.

The fishing operation undertaken are mostly very primitive, the boats used are small, propelled by sail or paddles and the gear is mainly of locally available materials. Some imported cotton is used in the construction of nets and lines.

The Government of the State of Brunei has advised the Secretariat of the Council that it is not in the position to participate in the Council's activities. However, Council documents and publications are transmitted for information.

SARAWAK

As yet no comprehensive national fishery policy has been formulated and it is unlikely that such a policy will be drafted until the appointment of a fully qualified Fisheries Officer to take charge of the Fisheries Branch of the Department of Agriculture.

Fisheries development activities have proceeded along the lines of simple extension projects such as loans to assist fishermen to instal inboard engines in their boats and the distribution of fish fry to encourage the development of fresh water fisheries.

Consolidating legislation has been introduced in relation to marine fisheries.

No research programs have as yet been drafted or initiated.

NORTH BORNEO

(1) Freshwater Fisheries.

The total number of fish ponds in the Colony at the end of 1957 was 617 totalling 34.9 acres. About 5 acres of fish ponds were built during the first eight months of 1958.

Total production of fish ponds in the Colony was estimated to be about 12 tons for year 1957. Some 25% of this yield were Chinese carp *(Ctenopharyngodon idellus. Aristichthys nobilis* and *Hypophthalmichthys molitrix)* and the remaining 75% Tilapia *(T. mossambic* common carp *(Cyprinus carpio)* and with small proportion of Sepat Siam *(Trichc pectoralis)* and Gorami *(Osphronemus gor* Pond fish fetch good prices in the markets—from $1.20 to $2.00 per katty—pr that they are sold alive and are reas large sized.

Tilapia and common carp are the s commonly cultured in small ponds, w the larger ponds Chinese carp and male (" Monosex " culture) are kept.

Stocking of natural swamps and with Tilapia has been particularly suc in the districts of Papar, Tenom, Ke and Tambunan; the fish have done m improve the nutrition of the local people.

In pond culture trials the two species namely: Ikan Belian *(Labeobarbus t* and Ikan Limbungan *(Leptobarbus hoeveni* found unsuitable, while Ikan Biawan or Gorami *(Helostoma temmicki)* showed pro

Artificial breeding of the Commo using the Javanese method, has been s fully applied since early 1958 at the Gove Central Fry Breeding Station, Tuaran.

(2) Marine Fisheries.

With the exception of the recen duction of trawl fishing in the Marudu Ba there has been little change in marine in other parts of the Colony, where it is confined to small scale operations insh in estuaries.

Trawl fishing in Marudu Bay com in June, 1958. One trawler of 90 tons tonnage and of Philippines origin was a licence to operate there for an initia of six months. Very good catches hav reported from this fishing ground, but the part of these catches consisted of low fish.

Mechanized fishing boats, using inboard and outboard engines, are be increasingly popular. There was a increase of outboard fishing boats on th Coast in 1957. A total of $14,000/— i was granted to fishermen by the North Credit Corporation for the purchase of and fishing gear in 1957.

:port of marine products, mainly in the
dried fish and prawns, and trochus
1957, was recorded as 1,213.03 tons
24,596/— in value which is about 200
some $400,000/— lower than in the
year.

HONG KONG

The total quantity of fish landed was slightly more than during the previous year and, at the same time, the highest figure since 1945. Recorded below are details of the quantity and value of fish sold through the Fish Marketing Organization. These figures include the controlled landings of foreign (Japanese) fish.

ear	Fresh Fish		Salt/Dried Fish		Total	
	Piculs (Tons)	Value $	Piculs (Tons)	Value $	Piculs (Tons)	Value $
956/57	608,058 (36,194)	43,288,947	88,788 (5,285)	4,521,485	696,846 (41,479)	47,810,432
955/56	572,194 (34,059)	33,350,140	89,968 (5,355)	3,854,090	662,162 (39,414)	37,204,430

ıe increased landings were mainly due
ood seasons enjoyed by a large number
anized junks, particularly the junk
nd large longliners. Fish prices during
previous years (1954/55 and 1955/56)
the lowest on record but fortunately
ishermen, these improved considerably
he year under review. The average
r picul for fresh fish increased from
71 (an increase of 22.4%) while that
dried fish went up from $43 to $51
%). During the year the mechanized
reased from 968 to 1,524 vessels, an
of 629.

ıe estimated total production from fish
ıs 6,900 piculs (i.e. 410.7 tons) valued
,000. Figures for the previous year
were 4,950 piculs (294.6 tons) valued
00. Due to the difficulties in obtaining
China, Hong Kong dealers exported
2,309 fry during the year (as compared
397,683 in 1955-56 and 25,146,950 in

ıring the year, 1,596,302 catties (i.e.
s) of fresh oyster meat valued at
0 was harvested from the Deep Bay
igures for 1955-56 were 15,763.2 piculs
ns) valued at $1,300,000). The bulk
yster meat was processed and exported
703,560½ catties (418.8 tons) of fresh
rimp valued at $1,604,150 (as against only 63,895 catties valued at $132,414 in 1955/56) were also exported. 11,000 catties of fresh shrimp (6.5 tons) valued at about $23,231 (as against 10,398 catties valued at $20,814 in 1955/56) were processed into slices and noodles for export. 61,822 catties of silver shrimp worth $21,415 (as against 116,971 catties worth $42,555 in 1955/56) were processed into sauce and paste for export. 37,238 catties (22.2 tons) of spotted fish valued at $90,565 (as against 36,315 catties worth $83,770 in 1955/56) were shipped overseas. A total of 4,100 blister pearls were cultivated at Kato during the course of a commercial pilot scale experiment. These were sent to Japan for processing. Fishermen working in the Tolo Harbour area, harvested about 98,240 catties (58.5 tons) of Fan Mussels valued at approximately $200,000.

SINGAPORE

The inshore fishing grounds of Singapore are extremely limited. The expansion of the offshore fisheries is however steadily progressing. The production of local fishing units increased from 9,500 tons in 1956 to 13,500 tons in 1957. Local companies are operating pair trawlers chartered from Japanese companies. The results of these operations are satisfactory and the demand for offshore fish is gradually increasing. At present eight trawlers are in operation and forty apprentices are being trained. Arrange-

ments to increase the trawler fleet to twenty vessels are being made. The total catch of these 8 trawlers amounted to 1,650 tons in 1957.

2. Many of the drift-netters are now replacing their ramie nets with nylon nets to increase their production. The instruction in the maintenance and repair of engines given to these drift netters during the last few years appears to be bearing fruit. They have been able to increase their fishing time and range of operations. The catches of these drift netters increased from 850 tons in 1956 to 1,800 tons in 1957 although the number of units in operation was not increased. This large increase in catch may be due to a higher availability of *Scomberomorus* spp. (Spanish mackerel) resulting from the higher availability of *Stolephorus* spp. (Anchovy) on which *Scomberomorus* spp. feed.

3. The catches of the fixed traps (the kelongs) also increased considerably from 4,860 tons in 1956 to 6,540 tons in 1957 as a result of greater availability of *Stolephorus* spp. (Anchovy). The number of kelongs in operation was increased in 1957. No marked changes were noted in respect of other fisheries.

4. Prices of fresh fish in Singapore have been kept steady during the greater part of 1957 in spite of increasing demand. Towards the end of 1957 a downward trend in the prices of certain types was noted. This downward trend continued into the first half of 1958.

5. Assistance to fishermen in the purchase of fishing materials at bulk prices was maintained through the Fishing Materials Purchase Account. The Fisheries Mobile Unit continued its operations in instructing the fishermen on the maintenance and repair of their fishing boat engines. A storm warning service was also initiated through local radio broadcasts. The water supply service to fishing boats was also maintained. Facilities were also provided for the loading of crushed ice and fuel into fishing vessels.

6. A pilot scheme for training boys in schools in fishing villages in subjects relevant to fishing operations was initiated. The subjects taught include:

(a) Elementary hydrology and marine biology.

(b) Construction and repair of nets and gears.

(c) Operation of various types of nets and gears.

(d) Building and repair of small b

(e) Engine maintenance and repa

(f) Rule of the Road at Sea.

(g) Preservation of fish.

Such instruction is considered necess order to select boys who have an aptitu fishing so that they could eventually be s for further training in offshore fisheries.

UNITED STATES OF AMERICA PACIFIC TERRITORIES

Results derived from data and in tion collected by the Pacific Oceanic Fi Investigation have resulted in im developments with increased catches equatorial and adjacent waters of the Pa

Studies of fish school behavi yielding information of considerable p value and, in conjunction with oceano and plankton studies, are aimed at the d ment of a prediction service.

Shortage of suitable bait fish i of the areas prompted experiments transplantation of numbers of Ma sardines. Early indications suggest tha introductions have a good chance of be established and so providing a much supply of bait for live-bait tuna fishing hitherto under-exploited.

Oceanographic studies from a he have been initiated. Valuable for locating fish schools and thence fishing vessels in the vicinity, this aircraft also offers useful facilities for ac certain scientific objectives including e of fish school abundance, collection o samples and measurement of sea temper

Preliminary trials indicates t operational costs of the helicopter sur somewhat less than half that for simil surveys and there is an appreciable sa time, while successive "stations" can be c with minimum time-lapse.

VIETNAM

1957 the fisheries administrative ions, formerly operating as two separate concerned respectively with Marine id Fisheries, were amalgamated into s Directorate. Simultaneously a com- e development plan was formulated taken to implement the primary phase n.

ntly with the Government of Thailand, e was sought through ICA to conduct l survey of the aquatic resources of the Gulf of Thailand. On a basis of this survey, plans for the exploitation of these resources will be developed.

Fisheries cooperative societies are well established, with a total membership of over 5,000 in 33 societies. Government provides advice and controls the issuance of loans to these societies.

An extensive programme for the development of inland fisheries particularly those associated with the periodical flooding of the Mekong River is being implemented.

APPENDIX: I

LIST OF DELEGATES AND OBSERVERS

Member Governments Country	*Names*	*Designation*	*Address*
Australia	Mr. D.J. Gates (Delegate)	Senior Research Officer	Commonwealth Fi Office, Department mary Industry, Canberra, ACT. Au
	Mr. J. Starey (Alternate)	3rd Secretary	Australian High C sion, 2nd Floor, Oriental Hotel, C 1, Ceylon.
Ceylon	Mr. D.T.E.A. de Fonseka (Delegate)	Director	Dept. of Fisheries Box 531, Colombo,
	Mr. L.F. Tissevera-singhe (Alternate)	Assistant Director	— do —
	Dr. S.W. Ling (Expert)	FAO/ETAP Fish Cul-turist	c/o FAO Mission P.O. Box 1505, Co Ceylon.
	Dr. L. Berube (Expert)	Director	Canadian Fisheries Colombo Plan, P.O 531, Colombo, Cey
	Mr. E.R. Kvaran (Expert)	FAO/ETAP Marine Fisheries Superinten-dent	c/o FAO Mission P.O. Box 1505, Co Ceylon.
	Mr. E.R. Barlind (Expert)	FAO/ETAP Fisheries Engineer	— do —
	Mr. C. Fernando (Expert)	Economist	Planning Secretaria lombo 1, Ceylon.
	Mr. G. Crane (Adviser)	Manager	Fisheries Plant Rock Lane, Colombo Ceylon.
	Dr. G.H.P. de Bruin (Adviser)	Research Officer	Department of Fis P.O. Box 531, Co Ceylon.
	Mr. G.N. de Silva (Adviser)	Statistical Officer	— do —
	Dr. T.P. Goonewardene (Adviser)	Research Officer	— do —
	Mr. S.R. Asirwatham (Adviser)	Asst. Commissioner of Cooperatives (Fish. Div.)	Cooperative Dept., Square Colombo 1,

r Governments Country	Names	Designation	Address
1 ontinued)	Mr. C. Gunasekera (Adviser)	Research Chemist	Department of Fisheries, P.O. Box 531, Colombo, Ceylon.
	Mr. L.D. Gunasekera (Adviser)	Assistant Manager	Fisheries Plant Rockhouse Lane, Colombo 15, Ceylon.
	Mr. H.H.A. Indrasena (Adviser)	Superintendent, Fresh Water Fisheries	Department of Fisheries, P.O. Box 531, Colombo, Ceylon.
	Dr. N. Mahadeva (Adviser)	Research Officer	— do —
	Mr. A.S. Mendis (Adviser)	Research Officer	— do —
	Mr. V.L.C. Pietersz (Adviser)	Assistant Director of Fisheries	— do —
	Mr. T.G. Pillai (Adviser)	Superintendent, Brackish Water Fisheries	— do —
	Mr. S. Sivalingam (Adviser)	Research Officer	— do —
	Mr. V. Selveratnam (Adviser)	Engineer	Fisheries Plant Rock House Lane, Colombo 15, Ceylon.
	Mr. C. Chanmugam (Adviser)	Assistant Secretary	Ministry of Industries & Fisheries, New Secretariat, Colombo 1, Ceylon.
	Mr. M.S. Perera (Adviser)	Member, Fisheries Advisory Board	Sirimahal, 42 Lady de Soysa Drive, Uyana, Moratuwa, Ceylon.
	Sir Philip Rodrigo (Adviser)	— do —	Wasala Walauwa, Rodrigo Place, Colombo 15, Ceylon.
	Mr. V. Suppiah (Adviser)	— do —	Thondaimannar, Ceylon.
e	Mr. M. Angot (Delegate)	Marine Biologist (Office de la Recherche Scientifique et Technique d'outre-Mer)	Institut Francais d'Oceanie, Noumea, P.O. Box 4, New Caledonia.
	Dr. B.S. Bhimachar (Delegate)	Chief Research Officer	Central Inland Fisheries, Research Station, 66 Upper Circular Road, Calcutta 9, India.
	Dr. K. Kuronuma (Delegate)	Chief	Fresh Water Fisheries Research Lab, Hinomachi, Tokyo, Japan.

Member Governments Country	*Names*	*Designation*	*Address*
Japan *(continued)*	Mr. M. Natsume (Alternate)	1st Secretary	Japanese Embassy lombo, Ceylon.
	Mr. J. Chiba (Adviser)	3rd Secretary	Japanese Embassy lombo, Ceylon.
	Mr. S. Jimboh (Adviser)	Colombo Plan Fisheries Expert	Fisheries Dept., B Colombo, Ceylon.
	Mr. K. Ishii (Adviser)	— do —	— do —
Korea	Mr. Pyong Sik Son (Delegate)	1st Secretary	Korean Embassy, Vietnam.
	Mr. Sang Kyu Nam (Alternate)	Chief	Fisheries Section, of Marine Affairs, Korea.
	Mr. H. Timmis (Adviser)	O.E.C. Fisheries Expert	UNC/OEC, A.P.O. 3 Francisco, Calif U.S.A. (Inter Area
Federation of Malaya	Mr. Soong Min Kong (Delegate)	Director	Fisheries Dept., P. 459, Penang, Mala
	Mr. Abdul Halim Abu Yamin (Alternate)	Acting Fisheries Officer, North East, Fed. of Malaya.	c/o Fisheries Dept., Trengganu Federa Malaya.
Netherlands	Dr. J.J. Schuurman (Delegate)	Lecturer in Fresh & Brackish Water Fisheries.	Agricultural Univ Wageningen, lands.
	Mr. C.T.F. Thurkow (Alternate)	2nd Secretary	Royal Netherlands tion, 29 Gregory's Colombo 7, Ceylon
Thailand	Mr. Wit Yorsaengrat (Delegate)	Deputy Director General	Fisheries Dept., Mini Agriculture, Rajad Avenue, Bangkok.
	Mr. Sant Bandhukul (Alternate)	Secretary	— do —
U.K. (for Hong Kong)	Dr. F.D. Ommanney (Delegate)	Director	Fisheries Research Pokfulum Road, U ty of Hong Kong Kong.
	Mr. W.D. Orchard (Alternate)	Fisheries Officer	Dept. of Agric., Fis Forestry, Kom Street, Laichikok loon, Hong Kong.

...er Governments Country	Name	Designation	Address
(for Hong ng) (continued)	Mr. I. Petersen (Adviser)	Marketing Officer	Cooperative & Marketing Dept., Tung Kun Street, Yaumati, Kowloon, Hong Kong.
	Mr. Y.K. Chau (Adviser)	Research Officer	Fisheries Research Unit, Pokfulum Road, University of Hong Kong, Hong Kong.
.	Mr. G.I. Murphy (Delegate)	Director	Pacific Oceanic Fishery Investigations, Fish and Wildlife Service, P.O. Box 3830, Honolulu, Hawaii.
am	Mr. Nguyen Nhu Nghi (Delegate)	Chief of Fisheries Industry	Direction of Fisheries, Ministry of National Economy, 116, Rue Richaud Saigon, Vietnam.
	Mr. Tran Van Tri (Alternate)	Chief of Water Resources Exploitation Service	— do —
	Mr. Le Van Dang (Adviser)	Fisheries Inspector Inland Fisheries	— do —
	Mr. R.J. Schoettler (Adviser)	USOM Fisheries Expert	c/o American Embassy, Box 32, Saigon, Vietnam.

OBSERVER ORGANIZATIONS AND NON-MEMBER GOVERNMENTS

Observer Organizations and Non-Member Governments	*Name*	*Designation*	*Address*
Ceylon Association for the Advancement of Science	Dr. C.H. Fernando (Observer)		Dept. of Zoology Ur Ceylon, Colombo 3, C
	Mr. E.L. Samarasinghe		— do —
UNTAB	Mr. J. Corry (Observer)	Resident Representative of the TAB, Ceylon	45, Alfred House Ga Colombo 3, Ceylon
University of Ceylon	Mr. P. Kirtisinghe (Observer)	Lecturer	Dept. of Zoology Un Ceylon, Colombo 3,
	Dr. A.C.J. Weerakoon (Observer)	Lecturer	— do —
South Pacific Commission	Mr. M. Angot	Marine Biologist (Office de la Recherche Scientifique et Technique d'outre-Mer)	Institut Français d'O Noumea, P.O. Box Caledonia.
Gal Oya Development Board, Ceylon	Mr. M. Kurumoorthy	O.I.C. Fisheries	Gal Oya Develo Board, Amparai, C

FOOD AND AGRICULTURE ORGANIZATION

Name	*Designation*	*Address*
ıet Su	Deputy Regional Representative	FAO Regional Office for Asia and the Far East, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand.
G. Mulgrue	Regional Information Adviser	— do —
A.G. Black	FAO Country Representative for Ceylon	FAO Mission Office, 75 Alfred House Gardens, P.O. Box 1505, Colombo, Ceylon.
R. Gurtner	FAO/ETAP Naval Architect	12106-3, 70 Fleet Road (Opposite College Grounds) Ernakulam, Kerala, India.
C. Illugason	FAO/ETAP Master Fisherman	c/o Director of Fisheries, Mysore, Bangalore, India.
H. Miyamoto	FAO/ETAP Fisheries Technologist	Central Fisheries Technological Station, XXI/29 Kochangadi, Cochin 5, Kerala State, India.

IPFC SECRETARIAT

Name	*Designation*	*Address*
T.A. Tubb	Secretary of the IPFC	Regional Fisheries Officer, FAO Regional Office for Asia and the Far East, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand.
S.J. Holt	Technical Secretary, Tech. Com. I	Chief, Research Programs Section, Fisheries Biology Branch, FAO, Viale delle Terme di Caracalla, Rome, Italy.
H. Kristjonsson	Technical Secretary, Tech. Com. II, Panel A	Chief, Fishing Gear Section, Technology Branch, Fisheries Division, FAO Viale delle Terme di Caracalla, Rome, Italy.
M.R. Khan	Technical Secretary, Tech. Com. II, Panel B	Assistant Regional Fisheries Officer, FAO Regional Office for Asia and the Far East, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand.

Name	*Designation*	*Address*
Mr. Y. Miyake	Technical Secretary, Tech. Com. II, Panel C	Fisheries Economist, Economics Br Fisheries Division, FAO Viale Terme di Caracalla, Rome, Ital
Mrs. A. Soulier	Conference Officer	Technical Assistant, Fisheries Div FAO Regional Office for Asia the Far East, Maliwan Mansion, Atit Road, Bangkok, Thailand.
Mr. P. Tolstoy	French/English Interpreter	c/o Mr. Obolensky, 9, Rue R Estienne Geneva, Switzerland.
Miss. E. Hedinger	— do —	5, Chemin de Malombre, Ge Switzerland.

ORGANIZING COMMITTEE

Mr. D.T.E.A. de Fonseka
Mr. L.F. Tisseverasinghe
Mr. C. Chanmugam
Mr. A.S. Mendis
Mr. W.A. Solomonsz

APPENDIX II.
IPFC NOMINATIONS FOR THE PERIOD BETWEEN 8th & 9th SESSIONS

At the 8th Session of the Council the following Member Governments were not represented: Burma, Cambodia, Pakistan and the Philippines. Nominations to the various Technical Committees, Panels, Sub-Committees etc. have been carried over from the 7th Session. Indonesia intimated by letter during the 8th Session its nominations.

ıber Government	*Administrative Correspondent*	*Bibliographic Correspondent*
ALIA	The Secretary, Department of External Affairs, Canberra, Australia.	Mrs. L.M. Willings, Division of Fisheries and Oceanography, CSIRO, P.O. Box 21, Cronulla, N.S.W., Australia.
	The Secretary, Ministry of Agriculture & Forests, Union of Burma, Rangoon, Burma.	U Ba Kyaw, Executive Officer, Division of Fisheries, Land & Rural Development Corporation, Corner of Dalhousie and Thompson Street, Rangoon, Burma.
DIA	Monsieur Sao Leang Chef, de Division des Pêches de Kandal, Direction des Eaux et Forêts, Phnom Penh, Cambodia.	Monsieur R. Lafont, Charge, l'Institut de Recherches Piscicoles, Phnom Penh, Cambodia.
N	Director of Fisheries, Department of Fisheries, P.O. Box 531, Colombo, Ceylon.	Director of Fisheries, Department of Fisheries, P.O. Box 531, Colombo, Ceylon.
E	Le Directeur de l'Office de la Recherche Scientifique et Technique d'Outre-Mer, 20-rue Monsieur, Paris VII, France.	Le Directeur de l'Office de La Recherche Scientifique et Technique d'Outre-Mer, 20-rue Monsieur, Paris VII, France.
	Dr. N.K. Panikkar, Fisheries Development Adviser, Department of Agriculture, Ministry of Food & Agriculture, New Delhi, India.	Dr. D.V. Bal, Director, Institute of Science, Mahatma Gandhi Road, Fort Bombay, India.
SIA	Mr. R.M. Soepanto Koesoemowinoto, Chief, Technical General Division, Sea Fisheries Service, 12 Djalan Kerapu, Djakarta, Indonesia.	Mrs. S. Boediningsih Soenjoto, Secretary, National IPFC Committee of Indonesia, Sea Fisheries Service, 12 Djalan Kerapu, Djakarta, Indonesia.
	Mr. Y. Ohkawara, Chief Economic & Social Section, United Nations Bureau, Ministry of Foreign Affairs, Chiyoda-ku, Tokyo, Japan.	Dr. N. Sasaki, Data and Statistics Section, Fisheries Agency, 2-2 Kasumigaseki, Chiyoda-ku, Tokyo, Japan.
	Mr. Chee Choul Keun, Director, Fisheries Bureau, Office of Marine Affairs, Seoul, Korea.	Mr. Nam Sang Kyu, Chief, Fishing Section, Bureau of Fisheries, Office of Marine Affairs, Seoul, Korea.

Member Government	*Administrative Correspondent*	*Bibliographic Correspondent*
FEDERATION OF MALAYA	Mr. Abdul Rahman Hamidon, Assistant Secretary, Ministry of Agriculture, Kuala Lumpur, Federation of Malaya.	Mr. Soong Min Kong, Director o eries Malaya, Fisheries Depar P.O. Box 459, Penang Federa Malaya.
NETHERLANDS	Mr. W.A. Mackenzie, Inspector of Sea Fisheries, Department of Agriculture & Fisheries, Hollandia, Netherlands New Guinea.	Dr. K.F. Vaas, Cobetstraat, Netherlands.
PAKISTAN	Dr. M.R. Qureshi, Director, Central Fisheries Department, Fish Harbour Buildings, West Wharf, Karachi-2, Pakistan.	Dr. M.H. Qadri, Departme Zoology, University of K Karachi, West Pakistan.
PHILIPPINES	Mr. C. Martin, Chief, Fisheries Research Division, Bureau of Fisheries, M.H. del Pilar Street, Manila, Philippines.	Mr. I.A. Ronquillo, Fishery Bi Fisheries Research Division, of Fisheries, M.H. del Pilar Manila, Philippines.
THAILAND	Mr. Boon Indrambarya, Director-General, Department of Fisheries, Rajadamnern Av., Bangkok, Thailand.	Mr. Jinda Thiemmedh, Facu Fisheries, Kasetsart Univ Bangkhen, Bangkok, Thailan
U.K. (for Singapore, Borneo & Sarawak)	U.K. Liaison Officer with U.N. Organizations, First Secretary, British Embassy, Bangkok, Thailand (29).	Dr. F.D. Ommanney, Director eries Research Unit, Pokfulu University of Hong Kong, Hon
U.K. (for Hong Kong)	Director, Department of Agriculture, Fisheries & Forestry, Kom Tsun Street, Laichikok, Kowloon, Hong Kong.	Director, Department of Agric Fisheries & Forestry, Kon Street, Laichikok, Kowloon Kong.
U.S.A.	Mr. Garth I. Murphy, Director, Pacific Oceanic Fishery Investigations, P.O. Box 3830, Honolulu, Hawaii (3).	Mr. J.E. King, Fishery Researc gist, POFI, P.O. Box 3830, H Hawaii.
VIETNAM	Le Secrétaire d'Etat à l'Economie Nationale, 59 Boulevard Gia Long, Saigon, Vietnam.	Dr. Ngo Ba Thanh, Directeur de Secrétariat à l'Economie Na B.P. 340, Saigon, Vietnam.

Member Governments	*Technical Committee I*	*Panel A (Inland Fisheries)*	*Panel B (Sea Fisherie)*
AUSTRALIA	Dr. G.F. Humphrey, Chief Division of Fisheries & Oceanography, CSIRO, Box 21, Cronulla N.S.W., Australia.	Dr. A.G. Nicholls, Senior Research Officer Division of Fisheries and Oceanography CSIRO, Box 21, Cronulla, N.S.W., Australia.	Dr. J.M. Thomson Senior, Research Officer Division of Fisheries & Oceanography CSIRO, Box 21, Cronulla, N.S.W., Australia.
BURMA	U. Ba Kyaw, Executive Officer, Division of Fisheries, Land Rural Development Corporation, Corner Dalhousie & Thompson Street Rangoon, Burma.	(No nomination)	U. Tint Hlaing Division of Fisheries, Land Rural Development Corporation, Corner Dalhousie & Thompson Street, Rangoon, Burma.
CAMBODIA	(No nomination)	M. Sao-Leang Chef de Division des Pêches de Kandal, Direction des Eaux et Forêts Phnom Penh, Cambodia.	(No nomination)
CEYLON	Director of Fisheries, Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.	Mr. A.S. Mendis, Research Officer, Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.	Mr. S. Sivalingam, Research Officer, Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.
FRANCE	Mr. J. Lemasson, Centre Technique Forestier Tropical, 45 Bis Avenue de la Belle, Gabrielle, Nogent-sur-marne (Seine) France.	Mr. J. Lemasson, Centre Technipue Forestier Tropical, 45 Bis Avenue de la Belle Gabrielle, Nogent-sur-marne (Seine) France.	Mr. M.P. Legand, Marine Biologist, Laboratoire d'Océanographie de L'Institut Français d'Océanie I.F.O. B.P. & Noumea, New Caledonia.
INDIA	Dr. B.S. Bhimachar, Chief Research Officer, Central Inland Fisheries Research Station, 66 Upper Circular Road, Calcutta 9, India.	Mr. K.H. Alikunhi Research Officer, Central Inland Fisheries, Cuttack, Orissa, India.	Dr. S. Jones, Chief Research Officer, Central Marine Fisheries Station, Mandapam Camp, P.O. S. India.
INDONESIA	Mr. Hasanuddin Saanin, Chief, Laboratory for Inland Fisheries, 1 Sempur, P.O. Box 51, Bogor, Indonesia.	M.R. Gelar Wiraatmadja, Chief, Education Division, Inland Fisheries, 17 Djalan Selabintana, Sukabumi, Java, Indonesia.	Mr. Mochamad Unar, Assistant Biologist, Sea Fisheries Service, 12 Djalan Kerapu, Djakarta, Indonesia.
JAPAN	Dr. K. Kuronuma, Chief, Fresh Water Fisheries Research Laboratory, Hinomachi, Minamitama-gun, Tokyo, Japan.	Dr. K. Kuronuma, Chief, Fresh Water Fisheries Research Laboratory, Hinomachi, Minamitama-gun, Tokyo, Japan.	Mr. Z. Nakai, Chief, Marine Resources Section, Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

Member Governments	*Technical Committee I*	*Panel A (Inland Fisheries)*	*Panel B (Sea Fisheries)*
KOREA	Mr. Chee Choul Keun, Director, Bureau of Fisheries, Office of Marine Affairs, Seoul, Korea.	Mr. Chung Moon Ki, Chief, Fisheries Inspection, Station, Office of Marine Affairs, Seoul, Korea.	Mr. Chee Choul Keun, Director, Bureau of Fisheries, Office of Marine Affairs, Seoul, Korea.
FEDERATION OF MALAYA	Mr. Soong Min Kong, Director of Fisheries, Fisheries Dept., P.O. Box 459, Penang, Federation of Malaya.	Mr. A.B.O. Marican, Fisheries Research Officer, H.Q. Fisheries Dept., P.O. Box 459, Penang, Federation of Malaya.	Mr. D. Pathansali, Fisheries Research Officer H.Q. Fisheries Dept., P.O. Box 459, Penang, Federation of Malaya.
NETHERLANDS	Dr. J.J. Schuurman, Van Iddekingeweg 56 Groningen, Netherlands.	Mr. J. de Vries, Department of Agriculture and Fisheries, Hollandia, Netherlands, New Guinea.	Mr. W.A. Mackenzie, Inspector of Sea Fisheries, Department of Agriculture & Fisheries, Hollandia, Netherlands, New Guinea.
PAKISTAN	Dr. N. Ahmad, Director of Fisheries, Government of East Bengal, Eden Building, Dacca, East Pakistan.	Mr. K.A. Husain, Warden of Fisheries, 2 Sanda Road, Lahore, West Pakistan.	Mr. A.G. Hussein, Deputy Director, Central Fisheries Department, Fish Harbour Bld. West Wharf, Karachi 2, West Pakistan.
PHILIPPINES	Mr. I.A. Ronquillo, Fishery Biologist, Fisheries Research Division, Bureau of Fisheries, M.H. del Pilar Street, Manila, Philippines.	Mr. P. Acosta, Fish Culturist, Inland Fisheries Division, Bureau of Fisheries, M.H. del Pilar Street, Manila, Philippines.	Mr. I.A. Ronquillo, Fishery Biologist, Fisheries Research Division, Bureau of Fisheries, M.H. del Pilar Street, Manila, Philippines.
THAILAND	Mr. Prida Karnasut, Chief, Division of Inland Fisheries, Department of Fisheries, Rajadamnern Av., Bangkok, Thailand.	Mr. Ariya Sidhimunka, Head, Inland Fisheries Station (Bung Borapet) Nakornsawan, Thailand.	Mr. Sant Bandhukul, Fisheries Officer, Department of Fisheries, Rajadamnern Av., Bangkok, Thailand.
U.K.	Mr. Y.K. Chau, Senior Research Officer, Fisheries Research Unit, Pokfulum Road, University of Hong Kong, Hong Kong.	Dr. G.R. Fish, Fish Culture Research Institute Batu Berendam, Malacca, Federation of Malaya.	Dr. F.D. Ommanney, Director, Fisheries Research Unit, Pokfulum Road, University of Hong Kong, Hong Kong.
U.S.A.	Director, Pacific Oceanic Fishery Investigations, Fish and Wildlife Service, P.O. Box 3830, Honolulu, Hawaii.	(No nomination)	Director, Pacific Oceanic Fishery Investigations, Fish and Wildlife Service, P.O. Box 3830, Honolulu, Hawaii.
VIETNAM	Mr. Le Van Dang, Fisheries Inspector Inland Fisheries, Direc-	Mr. Cao Thien Buu, Chef du Service de Pisciculture, B.P.	Dr. Ngo Ba Thanh, Directeur de Pêches du Vietnam, B.P. 340,

Member Government	*Technical Committee II*	*Panel A* (Craft and Gear)	*Panel B* (Food and Technology)	*Panel C* (Socio-Economics and Statistics)
AUSTRALIA	Mr. F.F. Anderson, Director, Commonwealth Fisheries Office, Dept. of Primary Industry, Barton, Canberra, ACT. Australia.	Mr. F.F. Anderson, Director, Commonwealth Fisheries Office, Dept. of Primary Industry, Barton, Canberra, ACT. Australia.	Dr. J.R. Vickery, Division of Food Preservation & Transport, CSIRO Homebush, N. S. W., Australia.	Mr. A.C. Bogg, Senior Research Officer, Fisheries Division, Dept. of Primary Industry, Canberra, ACT. Australia.
BURMA	U Ba Kyaw, Executive Officer, Division of Fisheries, Land & Rural Development Corporation, Corner Dalhousie & Thompson Street, Rangoon, Burma.	U. Ba Kyaw, Executive Officer, Division of Fisheries, Land & Rural Development Corporation, Corner Dalhousie & Thompson Street, Rangoon, Burma.	(No nomination)	(No nomination)
CAMBODIA	(No nomination)	(No nomination)	Mons. M.R. LaFont, Charge, l'Institut de Recherches Piscicoles, Phnom Penh, Cambodia.	Mons. Sao Leang, Chef de Division des Peches de Kandal, Direction des Eaux et Forets, Phnom Penh, Cambodia.
CEYLON	Mr. L.F. Tisseverasinghe Asst. Director, Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.	Mr. L.F. Tisseverasinghe Asst. Director, Fisheries, Research Station, P.O. Box 531, Colombo, Ceylon.	Mr. C.E. St. C. Gunasekera, Research Chemist, Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.	Mr. V.L.C. Pietersz, Asst. Director, Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.
FRANCE	Mr. R. Serene, Adviser, Institut Oceanographique de Nha Trang, Station Maritime de Cauda, Nha Trang, Vietnam.	(No nomination)	(No nomination)	(No nomination)
INDIA	Mr. K. Chidambaram, Department of Agriculture, Ministry of Food and Agriculture, New Delhi, India.	Mr. K. Gopinath Pillai, Director of Fisheries Kerala State, Trivandrum 3, India.	Mr. R. Venkataraman, Central Fisheries Technological Station, Cochin, India.	Dr. C.V. Kulkarni, Director of Fisheries, Taraporewala Aquarium, Marine Drive, Bombay, India.

Member Government	*Technical Committee II*	*Panel A* (Craft and Gear)	*Panel B* (Food and Technology)	*Panel C* (Socio-Economics and Statistics)
INDONESIA	Mr. G.M. Charidjie Kasuma, Deputy Head, Sea Fisheries Service 12 Djalan Kerapu, Djakarta, Indonesia.	Mr. R. Soenarto, Chief Fishing Technique Research Division, Sea Fisheries Service, 12 Djalan Kerapu, Djakarta, Indonesia.	Mr. Soenjoto Darmoredjo, Technological Research Officer, Sea Fisheries, Service, 12 Djalan Kerapu, Djakarta, Indonesia.	Mr. Eddiwan, Chairman, Federation of Indonesian Fisheries Cooperatives, 12 Djalan Kerapu, Djakarta, Indonesia.
JAPAN	Mr. N. Oka, Chief, Data and Statistics Section, Fisheries Agency, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.	Mr. S. Takayama, Chief, Fishing Gear and Method Section, Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.	Dr. H. Higashi, Chief Marine Product Utilization Section, Tokai Regional Fisheries Research Laboratory, Isukishima, Chuo-ku, Tokyo, Japan.	Mr. N. Oka, Chief, Data and Statistics Section, Fisheries Agency, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.
KOREA	Mr. Rhee Im Do, Chief, Central Fisheries Research Station, Pusan, Korea.	Mr. Rhee Im Do, Chief, Central Fisheries Research Station Pusan, Korea.	Mr. Rhee Bong Nae, Chief, Processing Section, Central Fisheries Research Station, Pusan, Korea.	Mr. Chee Choul Keun, Director, Bureau of Fisheries, Office of Marine Affairs, Seoul, Korea.
FEDERATION OF MALAYA	Mr. J.S. Scott, Deputy Director of Fisheries, H.Q. Fisheries Dept., P.O. 459 Box Penang, Federation of Malaya.	Mr. R.C. Cole, Fisheries Officer, North-West, Fisheries Dept., P.O. Box 459 Penang, Federation of Malaya.	Mr. V. Selvarajah, Fisheries Research Officer, Fisheries Dept., P.O. Box 459 Penang, Federation of Malaya.	Mr. Abdul Halim, Ag. Fisheries Officer, Northeast, Kuala Trengganu, Trengganu, Federation of Malaya.
NETHERLANDS	(No nomination)	Mr. W.A. Mackenzie, Inspector of Sea Fisheries, Dept. of Agriculture and Fisheries, Hollandia, Netherlands New Guinea.	(No nomination)	(No nomination)
PAKISTAN	Dr. M.R. Qureshi, Director of Fisheries, Central Fisheries Department, Fish Harbour Bld., West Wharf, Karachi 2, West Pakistan.	Mr. M.A. Burney, Fisheries Gear Technologist, Central Fisheries Department, Fish Harbour Building, West Wharf, Karachi 2, West Pakistan.	Mr. S.A. Ali, Deputy Director, Directorate of Fisheries, Comilla, East Pakistan.	Mr. S.A. Jaleel, Assistant Director, Central Fisheries Dept. Fish Harbour Building, West Wharf, Karachi 2, West Pakistan.
PHILIPPINES	Mr. C. Martin, Chief, Fisheries Research Divi-	Mr. S.B. Rasalan, Fishery Technologist, Marine	Mr. J.I. Sulit, Chemist, Fisheries Research Divi-	Mr. J. Montemayor, Fishery Statistician, Fish-

	Mr. Yuanthai Bamraj-Arinpai, Chief, Division of Fisheries Investigation, Dept. of Fisheries, Rajadamnern Av. Bangkok, Thailand.	Mr. Sanan Ruamraksa, Head, Fish Section, Department of Fisheries, Rajadamnern Av. Bangkok, Thailand.	M.C. Kosol Suriyathit Suriyong, Head, Technology Section, Department of Fisheries, Rajadamnern Av. Bangkok Thailand.	Mr. Klan Suwanrat, Head, Statistics Section, Department of Fisheries, Rajadamnern Av., Bangkok, Thailand.
U.K.	Mr. W.D. Orchard, Fisheries Officer, Department of Agriculture, Fisheries and Forestry, Kom Tsun St., Laichikok, Kowloon, Hong Kong.	Mr. W.D. Orchard, Fisheries Officer, Department of Agriculture, Fisheries and Forestry, Kom Tsun St. Laickikok, Kowloon, Hong Kong.	Mr. I. Petersen, Marketing Officer, Cooperative Marketing Department, Tung Kun St., Yaumati, Kowloon, Hong Kong.	Mr. C.Y. Chu, Asst- Research Officer, Fisheries, Research Unit, Pokfulum Rd., University of Hong Kong, Hong Kong.
U.S.A.	Mr. G.I. Murphy, Director, Pacific Oceanic Fishery Investigations, Fish & Wild Life Service, P.O. Box 3830, Honolulu, Hawaii.	Mr. A. Akana, Pacific Fishery Investigations, Fish & Wild Life Service, P.O. Box 3830, Honolulu, Hawaii.	(No nomination)	(No nomination)
VIETNAM	Mr. Tran Van Tri, Chef du Service d'exploitation des Ressources Aquatiques, B.P. 340, Saigon, Vietnam.	Mr. Tran Van Tri, Chef du Service d'exploitation des Ressources Aquatiques, B.P. 340, Saigon, Vietnam.	Mr. Nguyen Nhu Nghi, Chef du Service des Industries des Peches, B.P. 340, Saigon, Vietnam.	Mr. Pham Ngoc Dong, Chef du Service Socio Economique des Peches, B.P. 340, Saigon, Vietnam.

Member Government	*Fish Marketing Sub-Committee*	*Hilsa Sub-Committee*	*Rastrelliger Sub-Committee*	*Chanos Sub-Committee*	*Fish Culture in Rice Fields Sub-Committee*
AUSTRALIA	Mr. C.G. Setter, Assistant Director Common Wealth Fisheries Office, Dept. of Primary Industry, Barton, Canbera, A.C.T., Australia.	(No nomination)	(No nomination)	Dr. A.M. Rapson, Division of Fisheries, (Papua & New Guinea), Port Moresby, Territory of Papua & New Guinea, Australia.	(No nomination)
BURMA	(No nomination)	U Ba Kyaw, Executive Officer, Division of Fisheries, Land & Rural Development Corporation, Corner Dalhousie & Thompson St., Rangoon, Burma.	(No nomination)	(No nomination)	(No nomination)
CAMBODIA	(No nomination)	(No nomination)	(No nomination)	(No nomination)	(No nomination)
CEYLON	Mr.L.D.Gunasekera, Asst. Manger, Mutwal Fisheries Project, Rockhouse Lane, Colombo 15, Ceylon.	(No nomination)	Dr. T.P. Goonewardena, Research Officer, Dept. of Fisheries, P.O. Box 331, Colombo, Ceylon.	Mr. T.G. Pillai, Supdt. Brackish Water Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.	Mr. H.H.A. Indrasena, Supdt. Fresh Water Fisheries Research Station, P.O. Box 531, Colombo, Ceylon.
FRANCE	(No nomination)	(No nomination)	(No nomination)	(No nomination)	(No nomination)
INDIA	Mr. P.I. Chacko. Asst. Director of Fisheries, Govt. of Madras, Madras, India.	Dr. T.V.R. Pillay, Research Officer, Central Inland Fisheries Research Station, 66 Upper Circular Street	Dr. G. Seshappa, Asst. Research Officer, Central Marine Fisheries Reserrch Station, Mandapam Camp.	Mr. P.R.S. Tampy, Asst. Research Officer, Central Marine Fisheries Station, Mandapam Camp, P.O. South	Mr. C.P. Varma, Fisheries Development Officer, Patna, India.

	Sub-Committee		Sub-Committee		Fields Sub-Committee
INDONESIA	Mr. R. Soekarno, Chief, Socio–Economic Division, Inland Fisheries Service, 2 Nusantara, Djakarta, Indonesia.	(No nomination)	Mr. V. Soesanto, Chief, Biological Section, Sea Fisheries Service, 12 Djalan Kerapu, Djakarta, Indonesia.	Mr. R.M. Tjiptoaminoto, Chief, Inland Fisheries, East Java Province, Surabaja, Indonesia.	Mr. M. Ahjar, Chief, Inland Fisheries Service, West Java Province, 17 Djalan Wastu Rentjana, Bandung, Indonesia.
JAPAN	Mr. N. Oka, Chief, Data and Statistics Section, Fisheries Agency, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.	(No nomination)	(No nomination)	(No nomination)	Dr. K. Kuronuma, Chief, Fresh Water Fisheries, Research Laboratory, Hinomachi, Minamitamigun, Tokyo, Japan.
KOREA	Mr. Kim Myung Nyun, Chief, Processing Section, Bureau of Fisheries, Office of Marise Affairs, Seoul, Korea.	(No nomination)	(No nomination)	(No nomination)	(No nomination)
FEDERATION of MALAYA	Mr. Heong Kok Hee, Distribution & Marketing Section, H.Q. Fisheries Department, P.O. Box 459, Penang, Federation of Malaya.	(No nomination)	Mr. D. Pathansali, Fisheries, Research Officer, H.Q. Fisheries Dept. P.O. Box 459, Penang, Federation of Malaya.	(No nomination)	Mr. A.B.O. Merican, Fisheries Research Officer, H.Q. Fisheries Department, P.O. Box 459, Penang, Federation of Malaya.
NETHERLANDS	(No nomination)	(No nomination)	Mr. W.A. McKenzie, Inspector of Fisheries, Dept. of Agriculture and Fisheries, Hollandia, Netherlands New Guinea.	(No nomination)	Mr. Reeskamp, Dept. of Agriculture and Fisheries, Hollandia, Netherlands New Guinea.

Member Government	*Fish Marketing Sub-Committee*	*Hilsa Sub-Committee*	*Rastrelliger Sub-Committee*	*Chanos Sub-Committee*	*Fish Culture in Rice Fields Sub-Committee*
PAKISTAN	Mr. S.A. Jaleel, Assistant Director, Central Fisheries Department, Fish Harbour Bld., West Wharf, Karachi 2 West Pakistan.	1. Dr. Nazir Ahmad, Director of Fisheries, Govt. of E. Bengal, Eden Buildings, Dacca, (E. Pakistan). 2. Dr. M.R. Qureshi, Director of Fisheries, Central Fisheries Dept, Karachi 2, Pakistan.	(No nomination)	(No nomination)	Mr. A.R.K. Zobairi, Deputy Director, Directorate of Fisheries, Eden Building, Dacca, East Pakistan.
PHILIPPINES	Mr. J. Montemayor, Fishery Statistician, Fisheries Research Division, Bureau of Fisheries, M.H. del Pilar St., Manila, Philippines.	(No nomination)	Mr. I.A. Ronquillo, Fishery Biologist, Fisheries Research Division, Bureau of Fisheries, M.H. del Pilar St., Manila, Philippines.	Mr. H.R. Rabanal, Fishery Culturist, Inland Fisheries Division, Bureau of Fisheries, M.H. del Pilar St., Manila, Philippines.	(No nomination)
THAILAND	(No nomination)	(No nomination)	Mr. Sant Bandhukul, Fisheries Officer, Department of Fisheries, Rajadamnern Av., Bangkok, Thailand.	Mr. Prida Karnasut, Chief, Division of Inland Fisheries, Department of Fisheries, Rajadamnern Av., Bangkok, Thailand.	(No nomination)
U.K.	Mr. I. Petersen, Marketing Officer, Cooperative Marketing Dept., Tung Kun Street, Yaumati, Kowloon, Hong Kong.	(No nomination)	(No nomination)	(No nomination)	(No nomination)
U.S.A.	(No nomination)	(No nomination)	(No nomination)	(No nomination)	(No nomination)
VIETNAM	Mr. Nguyen Van Tich, Chef de Bureau Socio–Eco-	(No nomination)	(No nomination)	Mr. Le Van Dang, Inspector of Inland Fisheries, B.P. 340, Saigon, Vietnam.	Mr. Le Van Dang, Inspector of Inland Fisheries, B.P. 340, Saigon, Vietnam.

CHAIRMEN AND RAPPORTEURS

TECHNICAL COMMITTEE I

Chairman	—	Mr. Soong Min Kong	(Fed. of Malaya)
Rapporteur	—	Dr. B.S. Bhimachar	(India)

PANEL A

Chairman	—	Mr. A. S. Mendis	(Ceylon)

PANEL B

Chairman	—	Mr. G.I. Murphy	(U.S.A.)

TECHNICAL COMMITTEE II

Chairman	—	Mr. L.F. Tisseverasinghe	(Ceylon)
Rapporteur	—	Mr. V.L.C. Pietersz	(Ceylon)

PANEL A

Chairman	—	Mr. W.D. Orchard	(U.K. -Hong Kong)

PANEL B

Chairman	—	Mr. C.E. St. C. Gunasekera	(Ceylon)

PANEL C

Chairman	—	Mr. Abdul Halim	(Fed. of Malaya)

COMMITTEES

Fishmarketing

Chairman	—	Mr. I. Petersen	(U.K. -Hong Kong)

Hilsa

Chairman	—	Dr. T.V.R. Pillay	(India)

Rastrelliger

Chairman	—	Mr. Sant Bandhukul	(Thailand)

Chanos

Chairman	—	(Activity suspended for inter-session period)	

Fish Culture in Rice Fields

Chairman	—	Mr. Le Van Dang	(Vietnam)

APPENDIX III
LIST OF DOCUMENTS

INCIDENTAL PAPERS: General Information — IPFC 8th Session-issued in advar unnumbered.

IPFC/C58/INC	1	Provisional List of Delegates and observers.
	2	List of Documents.
	3	IPFC Nomination Forms.
	4	Provisional Program.
	5	Tours for Indo-Pacific Fisheries Council Delegates.
	6	General Information.
	7	IPFC Nominations for period between 8th & 9th Sessions.
	8	Program for Official Opening Ceremony of the 8th Session IPFC.
	9	Opening Statements.

WORKING PAPERS:

IPFC/C58/WP	1	A Motion for the Amendment of the Agreement and Rules of Procedure.
IPFC/C58/WP	2	Provisional Agenda and Annotations.
	2 (Fr.)	Ditto in French.
	3	The Work of the Indo-Pacific Fisheries Council and its Relatio National Fisheries Policies.
	4	United Nations Conference on the Law of the Sea.
	5	The Boat and the Beach.
	6	Report of Technical Committee II (between 7th & 8th Sessions
	*6 Add: 1	Appendix for Technical Committee II. Report by the Fishing Se Bureau of Fisheries-Korea.
	6 Cor: 1	Amendments to Technical Committee II. Report (page 51-52).
	6 Add: 2	Additions to Technical Committee II. Report Statistics & Socio-econ (page 53-67).
	6 Rev. 1	Report of Technical Committee II — Part A Period between 7th & Sessions of the Council (revised).
	7	Communication concerning a Central Agency for 14C determina (Measurements of primary production in the Sea) at Cha tenlund, Slot, Denmark.
	8	Report on the Status of the Industry.
	8 Add:	Addition to the above. General Situation of Japanese Fisheries (page 49—51)
	9	4th FAO Regional Conference for Asia and the Far East.
	10	Proposed Method of Operation of Council and Technical Comm during the Session.
	11	Report of the Executive Committee.
	12	Indo-Pacific Fisheries Year.
	13	Projects and proposals related to the Indo-Pacific Region (UNE
	14	FAO Indo-Pacific Taining Center in Fisheries Statistics.

15		Report of the Sub-Committee on Fish Marketing. Review of Government Fish Marketing Activities in the Indo-Pacific Region.
16		FAO Indo-Pacific Training Centre in Fishery Cooperatives and Administration.
17		Provisional Agenda — Technical Committee II
18		Record of exchanges made by Technical Committee I in the inter-session period since the 7th session of the Council with regard to the subjects under discussion at the 7th Session, Part A.
*18	Add: 1	The Reports to Technical Committee I, 8th Session IPFC, Colombo, by the Fishing Section, Bureau of Fisheries—Korea.
18	Add: 2	General note on the Procedures of Technical Committee I and on the status of its work.
19		Questionnaire on edible Mollusks.
20		FAO Fisheries Activities in the Region.
21		Note for IPFC on Training Centers.
22		Schedule of Meetings of interest to IPFC.
23		Symposium: Improved types of fishing from small mechanized boats.
24		Report of the Chairman of the Working group on Fish Culture in Rice Fields.
25		Synopsis of Biological data on milk fish, *Chanos chanos* (Forskal) 1775.
26		Report of the Work of the Hilsa Sub-Committee during the period after the 7th Session of the Indo-Pacific Fisheries Council.
27		Note on the present position regarding the development of a surf going beach landing fishing boat in India.
28		Report of the International Training Center on the Methodology and Techniques of Research on Mackerel (Rastrelliger) Bangkok, Thailand 20 October - 28 November, 1958, by S.J. Holt.
29		Notes for Technical Committee II.
29	Add: 1	Extract from Summary Record of the 6th Session IPFC, Japan.
30		Summary Record of 1st Session, Technical Committee I.
31		Summary Record of 1st Session, Technical Committee II.
32		Technical Committee II - Elections.
33		Operational Plan for the World Scientific meeting on the Biology of Sardines and related species.
34		The Work in fishery economics and statistics in 1960 and 1961.
35		Programme for Technical Committee II.
36		Classified List of Documents.
37		Plan of work for Technical Committee I.
37	Rev. 1	Ditto (revised)
38		Summary Record of the 2nd Session, Technical Committee II.
**39		Draft prospectus for a proposed Fishery Surveys Center for the countries of the Indo-Pacific Region.
40		Secretary's Report on Credentials.
41		Report by the Sub-Committee on Marketing.

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WORKING PAPERS: (continued)

IPFC/C58/WP	42	Technical Committee I Report-Part B — (Draft)
	43	Statement by the Delegate for Korea regarding the Report on the Pacific Fisheries Year.
	44	Report of the Ad Hoc Committee to consider the Executive Comm Report.
	45	Resolution on Bibliographies by the Delegate for Australia.
	46	Resolution by the Delegate for USA on Technical/Sub-Com Meetings.
	47	Summary Record of 3rd Session. Technical Committee II.
	48	Record of meeting of Ad-Hoc Committee on Budget Proposals.
	49	Proposal for the Amendment of the Agreement submitted by the De for the Netherlands.
	50	Report of Technical Committee II—Part B.
	51	Proposed by the Delegate for France-Operation of Technical Comm
	51 Rev : 1	Ditto (revised)
	51 Rev : 1	(fr.) Ditto (French)
	52	Recommendations—proposal by the Delegate for Vietnam.
	53	The Organization of the Central Fisheries Technological Re Station, Cochin, India, and Outline of the Program of W the Station.
	54	IPFC Publications.
	55	Report of Editorial Committee.
	56	Technical Committee I-Proposal regarding Committee Meetings, Committees & Panels.

FILM SHOWS:

Dec. 11th.	Kuremona Manryo	Colour	28	Mins.	FAO No. 19
	Pride and Progress	Black & White	30	„	Ceylon
	Fish Spoilage Control	Colour	10	„	FAO No. 12
	Outboard Fishermen of the U.S.A.	Colour	27	„	FAO No. 25
Dec. 19th.	Californian Tuna Fishermen	Colour	25	„	New Caledo
	The Trawl in Action Pt. I	Black & White	15	„	Ceylon
	Pt. II	Black & White	30	„	Ceylon
	Fishermen of Negombo	„	25	„	Ceylon
	Shark Fishing	„	15	„	FAO No. 3
	Wonders of the Depths	„	15	„	Ceylon
	Slides—Grass Carp				Dr. K. Kuro

TECHNICAL PAPERS: *Note* :— Where Abstracts and/or Summaries have been provided the been embodied in the paper.

			Subject
IPFC/C58/TECH	1	Experiments on Fishing Net Preservation..... H. Miyamoto and A.T. Shariff	Craft and
	2	Storage of Dried Fish..... J.S. Scott	Food Technolo
	3	Lowering the Solidification Point of Coconut Oil ..... H. Hardjohutomo	Food Technolo

			Subject
C58/TECH	4	Note sur la préparation de farine de poisson à partir des résidus provenant de la fabrication des graisses de poissons d'eau du Cambodge : Utilization directe dans l'alimentation des volailles de farine non deshuilee ..... R. Lafont	Food Technology
	5	Some Aspects of Cockle (Anadara granosa L.) Culture in Malaya ..... D. Pathansali & Soong Min Kong	Sea Fisheries
	6	Production of Dehydrated Fish Meat ..... J.I. Sulit, D.L. Galvez and F.R. Gonzales	Food Technology
	7	Studies on the Processing and Storage of Dried split-salted Bisugo (Nemipterus spp.)... J.I. Sulit and S.V. Laron	Food Technology
	8	Fishing Efficiency of Otter Trawl aided with a Kite ..... Shigene Takayama	Craft and Gear
	9	Notes on Fisheries Technological Research in Thailand ..... K. Suriyong, B. Kasemsarn, S. Panjamapirom, P. Nittayachinta and U. Sunthornvipat	Food Technology
	10	Common Economic and Commercial Fishes of Indonesia ..... Mohammad Unar and M. Sachlan	Biology
	11	Notes on Tests in Thailand on the Acceptability of Good Quality Fish Meal for Human Consumption ..... Uthai Bisalyaputra and Kosol Suriyong	Food Technology
	12	Utilization of Fish Liver Residues ..... C. Gunasekera	Food Technology
	13	General Features and Productivity of the Wadge Bank. Contribution No. 3 The Ariids (Cat fishes) ..... S. Sivalingam	Sea Fisheries
	14	Reclamation of Derelict Water Areas in East Pakistan..... N. Ahmad	Inland Fisheries
	15	Some Statistical Data on Fisheries in Indonesia ..... K. Koestedjo.	Socio Economic & Statistics
	16	Preliminary Report on Transportation of *Chanos*-Fingerlings with Aerating System..... R. Roestami Djajadiredja	Fish Culture
	17	Preliminary Experimentation on the Use of Coconut oil in Canned Fish and the Suitability of Processing Methods ..... Soejarwidodo.	Food Technology

			Subject
IPFC/C58/TECH	18	The Transportation of *Chanos* Fingerlings and their Mortality ..... R. Mardjoko Tjiptoaminoto and M. Sachlan.	Fish Culture
	19	Some Observations on *Chanos* Culture in Fresh Water ..... R. Roestami Djajadiredja and Ruchiat Amidjaja	Fish Culture
	20	Relation between Fish Culture in Rice Fields and Malaria ..... Gelar Wiraatmadja & R. Djamhur.	Fish Culture
	21	The Use of Endrin as a Piscicide in Mining Pools and Fish ponds in Malaya ..... M.K. Soong & A.B.O. Merican	Fish Culture
	22	Fisheries Finance in Japan..... Kohei Teshima	Socio Econo
	23	The Motorization of Fishing Craft at Vietnam Tran Van Tri	Craft & Gea
	24	Contribution à l'étude du Nuoc-mam condensé au Vietnam ..... Nguyen Nhu Nghi	Food Technology
	*25	Underwater Electric Lamps for Light Fishing H. Kristjonsson	Craft & Gea
	26	Considerations on Fishermen's Training ..... P.A. Lusyne	Socio Econo

SYMPOSIUM PAPERS: *"SYMPOSIUM ON FISH BEHAVIOR"*

IPFC/C58/SYM	1	Prospectus for the Symposium on Fish Behavior
	2	Preliminary Results of Underwater Observations of Tuna School Practical Applications of these Results D.W. Strasburg and H.S.H. Yuen
	3	Fish Behavior and the Planktonic Environment: The Role of Observations R.S. Glover
	4	Les migrations de Poissons dans les Eaux douces Tropicales Africai J. Daget
	5	Symposium on Fish Behavior. Analysis of Behavior in Commensali
	6	The Commercial Value of Studies on Fish Behavior with Parti Reference to Lake Victoria R.S.A. Beauchamp
	7	Some Preliminary Observations on the Avoidance of Obstacles by He *(Clupea Harengus* L*)* J.H.S. Blaxter, F.G.T. Holliday & B.B. Parrish.

* In very limited numbers

8	Some Notes on Establishment and Maintenance of Atlantic Herring *(Clupea Harengus* L*)* in Aquaria B.B. Parish, J.H.S. Blaxter + F.G.T. Holliday
9	A Contribution to the Study of Fish Behavior S.G. Zusser
10	Research on the Behavior of Atlantic Salmon at the Biological Station, St. Andrews, N.B. M.H.A. Keenleyside
12	Notes on : The Elementary Actions G.L. Kesteven.
13	Reactions of Fish to Stimuli F.R. Harden-Jones.
14	Notes on : The Basis, Control and Integration of Behavior G.L. Kesteven
15	The Experimental Study of Behavior in Fish F.E.J. Fry.
19	Notes on : The Patterns of Behavior G.L. Kesteven.
20	Some Terms used in Behavior Research G.L. Kesteven.
21	Fish Behavior with Special Reference to Pelagic Shoaling Species : Lajang (Decapterus sp.) Soemarto.
22	On the Behavior of Lemuru, *Sardinella Allceia* (RAF) at Bali Strait R. Soerjodinoto.
23	Some Knowledge on Behavior of Fish Schools M. Nomura
24	Report on the Symposium.

Nos 11, 16, 17, 18 allocated to papers which eventually were not presented.

RIBUTED PUBLICATIONS: Please note that the following publications have been made available to the Council in limited supply. These have been distributed as widely as possible. When numbers of copies have been small, distribution has been limited to heads of Delegations only.

C58/CP 1 Films on Fisheries and related Subjects-Mimeo FAO/58/1/337, 1957, Rome (Revised)

2 Zooplankton — Factors affecting its Abundance and Distribution, with special consideration to the relation to phytoplankton and fisheries by T. Laevastu. Mimeo, FAO/58/4/2529, FAO Fisheries Div. Rome. March 1958.

3 The oceanographical conditions for life and abundance of phytoplankton considered with respect to fisheries by G.L. Kesteven and T. Laevastu. Mimeo, FAO/58/5/3749, FAO Fisheries Div. Rome, May 1958.

4 Economic survey of Pla-Tu salting Industry 1956. Agricult Economic Division, Ministry of Agriculture, Bangkok, Thail 1958.

5 2nd World Fishing Boat Congress Prospectus, April 1959. Mi FAO 58/5/3942, Fisheries Div., Rome.

6 Prawn and prawn fishery of East Pakistan by N. Ahmad. East Paki Government Press, Dacca, 1957.

7 IPFC Expanded Technical Assistance Programme, Far East Regi Training Centre, Mimeo, IPFC, Occasional Paper 58/1. Bangkok. 1958.

8 Lists of A. Manufacturers of nylon yarn and other synthetic fibres
B. Manufacturers and/or suppliers of nets, nettings twines made of Nylon or other synthetic fibres
C. Manufacturers and/or suppliers of fishing lines mad Nylon or other synthetic fibre materials.
by the Technology Branch, Fisheries Division, FAO, Rome. Mi FAO/58/1/107, December 1957 (Second compilation)

9 Saving Water in Dams, CSIRO Leaflet series No. 15, Melbou Australia, 1956.

10 Craft and gear utilized in the *Rastrelliger* Fisheries by V. Soes and W. Soebany.

11 *Rastrelliger* Landings 1954—57 by V. Soesanto.

12 Indoor Drying of salt fish in South Brazil-Mimeo, FAO Fishe papers No. 13, August 1958.

13 Study on the Toxicity of Agricultural control chemicals in rela to Freshwater Fisheries Mana ement No. 1. General sum of the studies on the toxicity of agricultural insecticides freshwater fishes by means of the Bio-assay method (part by Sekio Kimura and Yoshihiro Matida. Reprint Bull. Fr water Fisheries Research Laboratory, **7** (2): 51-53, 1958.

14 Study on the Toxicity of Agricultural control chemicals in relatio Freshwater Fisheries Management No. 2. Toxicity of agricul insecticides to *Daphnia Carinata* King by Yoshihiro Matida Noriko Kawasaki. Reprint Bull. Freshwater Fisheries Rese Laboratory, 8 (1) : 1-6, 1957.

15 Bibliography on Fish Marketing for the Indo-Pacific Region (d Mimeo FAO/58/10/7798, Fisheries Div. Rome.

16 Some problems for Biological Fishery Survey and Techniques for solution. Interna tional Commission for the Northwest At Fisheries Special Publication No. 1, 1958.

17 Mechanization of Fishing Craft and the use of improved fishing by E.R.A. de Zylva. Fisheries Research Station, Dept. of Fish Ceylon Bull. No. 7, 1958.

18 Fish Production and Consumption in West Java by Rabbul H (English version). Also published in Berita Perikanan (Indon version), No. 7/8, Sept./Oct., Vol. 10, 1958.

19 Fish Production and fish trade with special reference to the areas of Bandjar and Hulu Sungai (South Kalimantan) by R. Soekarno (English version). Also published in Berita Perikanan (Indonesian version) No. 9, Vol. 10, 1958.

20 The function and significance of fish culture in relation to the Regional Village economy by R. Soekarno (English version). Also publshed in Berita Perikanan (Indonesian version) No. 11/12, Jan./Feb., Vol. 10, 1958.

21 A guide to the Fisheries of Ceylon. Fisheries Research Station, Department of Fisheries, Ceylon Bulletin No. 8, 1958.

22 Hong Kong University Fisheries Journal No. 2, Sept, 1958.

23 Net materials of Synthetic Fibers by A. von Brandt. Reprint, F.A.O. Fisheries Bulletin 10, (4). Oct/Dec., 1957.

24 Some experiments on Tuna fishing with a new method in the Indonesian waters by M. Unar. (Mimeo) Sea Fisheries Service, Djakarta, Indonesia.

25 Supplementary notes to "Study on the Toxicity of Agricultural control chemicals in relation to fresh water Fisheries Management No. 1 by Y. Matida & S. Kimura (Mimeo) Freshwater fisheries Research Laboratory, Hinomachi, Tokyo, Japan.

26 Studies on Trawl Net I. A Net-Mouth stretcher working as kite principle by S. Takayama and T. Koyama. Reprint. Bull. Tokai Reg. Fish Res. Lab. No. 19. 1958.

27 Annual Departmental Reports 1957 - 58, Registrar of Cooperative Societies and Director of Marketing, Hong Kong.

28 The progress of mechanization of fishing craft and the use of improved gear in Ceylon by E.R.A. de Zylva (Mimeo, in the press)

29 The value of Filamentous Algae for the growth of *Chanos chanos* (Forskal) by J.J. Schuurman. Reprint.

30 Report of the FAO Training Centre in fishery Co-operatives and Administration VOL. I & II, FAO 1958.

31 Description of four types of feeding by shoaling fish and the protein values of some fish foods by A.M. Rapson. Extract, Papua and New Gunea Agrie. Journ. 2 (3) : 1956.

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TES:

58/M

1. Minutes of the official opening of the Eighth Session of the Indo - Pacific Fisheries Council.
2. Minutes of the First Plenary Meeting - Dec. 8
3. Minutes of the Second Plenary Meeting - Dec. 8
4. Minutes of the Third Plenary Meeting - Dec. 9
5. Minutes of the Fourth Plenary Meeting - Dec. 11
6. Minutes of the Fifth Plenary Meeting - Dec. 12
7. Minutes of the Sixth Plenary Meeting - Dec. 15
8. Minutes of the Seventh Plenary Meeting - Dec. 16
9. Minutes of the Eighth Plenary Meeting - Dec. 19
10. Minutes of the Ninth Plenary Meeting - Dec. 19
11. Minutes of the Final Plenary Meeting - Dec. 22

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ON GOVERNMENT PUBLICITY BUREAU:

Ceylon (Guide Book)
Map of Ceylon
Map of Colombo Fort & Environs
Under water Ceylon (pamphlet)
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58/P

1. Message of welcome by the Hon'ble Prime Minister of Ceylon, Mr. S.W.R.D. Bandaranaike.
2. Opening address by the Hon'ble M.P., P.H. William de Silva, Minister of Industries & Fisheries, Ceylon.
3. Address by Dr. B.R. Sen, Director Genaral of the Food and Agriculture Organization of the United Nations.
4. Address by the Chairman of the Indo-Pacific Fisheries Council. Dr. K. Kuronuma.
5. Cable message from Dr. D.B. Finn, Director of the FAO Fisheries Division, Rome.

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